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Few New Things Seen at Chicago Show

Attendance at Truck Show Somewhat Better Than at New York. Farm Bodies and Pneumatic Tires Predominate. Many Hotel Exhibits During Show Week

CHICAGO'S annual motor truck show, held this year in the heavy atmosphere of the odorous stock yards, has gone down into automotive history as one of the most comprehensive exhibits of motor transportation ever staged, and as one of the least useful to the manufacturers who participated in it. While some few manufacturers seem satisfied with the show and its results, the majority seem of the opinion that a motor truck show, staged far from the center of the city, difficult to reach and hedged around with petty restrictions, is not the kind of sales investment they want in the future. Whether a down-town show, handled in a more liberal manner, will meet the requirements of the industry in the future is in itself a mooted question, and there is little doubt but that between now and show time next year there will be a threshing out of this truck show subject that will be thoroughly enlightening and that will clear the atmosphere wonderfully. First announcement of the New York and Chicago truck show locations brought much speculation from manufacturers as to whether it was worth while to spend so much money on exhibits so far from the business centers. But they are a game lot, these manufacturers, and they were willing to try it out, even though paying dearly for the privilege.

New York showed them that the plan was not a good one, and Chicago cinched the argument.

Poor Location of Building a Detriment

They were too busy between the two shows to analyze the results obtained in New York, but today, with their shoes cleaned of the slimy mud they had to wade through getting to the Chicago show, they are pretty well satisfied that if they are to be counted exhibitors in a future show, that show will at least have to be somewhere near the center of the city wherever it is held.

Many truck manufacturers have figured that an exhibit of their complete line of trucks in their distributors place of business in New York or Chicago with a business headquarters maintained for the sales force in a down town hotel, is a far better investment than space in the truck show, and it is not at all unlikely that another year will see a development of this idea on a bigger scale during passenger car show week, or the staging of an outdoor show at another time of the year.

Within its limitations the Chicago show was well staged. In the big pavilion the display was well arranged and the visitor could get a very comprehensive idea of

The S. A. E. Dinner Held During Chicago Show Week Was a Well-Attended Event

the various units. In the other sections of the exhibit the visitor found himself frequently bewildered and doubling back over his own tracks when he thought he was exploring new aisles. Doubtless more than one left the place secure in the belief that he had seen all exhibits, when in fact some obscure aisle or entrance to another section had been missed entirely.

The manufacturers who exhibited did their part nobly. As a transportation exhibit it was inspiring and the dealer prospect or buyer who could look over the trucks shown and not sell himself thoroughly on the motor truck as a splendid business investment must have been a hard-boiled prospect indeed. Unfortunately the attendance was far from satisfactory, for the exhibit should have been seen by hundreds of thousands.

Pneumatic Tires Shown in Great Numbers

As would be expected in the heart of the midwest district, the percentage of trucks fitted with pneumatic tires was larger than at any previous show, and those prospects who came from the dirt road districts were given stronger arguments, because of this addition to truck utility, than they had ever heard before. They saw possibilities never before open to them, and this knowledge will no doubt have a direct bearing on rural sales throughout west during the coming year.

There was also a difference noted in the body equipment at the Chicago show, as compared with New York. More combination farm bodies, stock racks and fittings that would appeal to the farmer prospect, were shown, and judging from the number of rural visitors at the show this was good business. For Chicago always has a larger proportion who show in many ways their rural residence than any other of the large shows. And these men, today, have real money to buy motor trucks and need only the final argument of real economy and utility to make them truckowners.

The exhibit of motor truck equipment and parts of all kinds was thoroughly comprehensive and well displayed. It is hardly necessary to state, however, that the balcony where most of these were shown was not overcrowded at any time.

The highway transport conferences held in connection with the show were, as in New York, very slimly attended. With every reason for big attendance, with very worth-while programs prepared for every day, these conferences could have done a world of good if only large audiences of those interested could have been prevailed upon to attend. Unfortunately this seemed impossible of accomplishment, and much of the effort went for naught.

N. A. D. A. Holds Meeting During Show Week

Rounding out its most successful year the National Automobile Dealers' Association held its third annual meeting at the La Salle Hotel, in Chicago, Monday and Tuesday of show week. Officers were elected, slight changes were made in its organization methods, and plans were made for a busy year. The new officers are as follows:

President, H. B. Harper, Philadelphia; First vice-president, P. H. Greer, Los Angeles; Second vice-president, W. J. Brace, Kansas City; treasurer, F. W. A. Vesper, St. Louis; secretary and general manager, Harry G. Moock, St. Louis.

The following board of directors was elected:

R. W. Powers, Providence, R. I.; Walter Woods, New York; A. E. Mitzel, Canton, Ohio; George D. McCutcheon, Atlanta; J. A. Graham, Minneapolis; George D. Wray, Shreveport, La.; Tom Botterill, Denver, Colo.; Thomas J. Hay, Chicago; Chester N. Weaver, San Francisco; Harry D. Austin, Seattle.

H. B. Harper
Elected President of the N. A. D. A.

The association is growing stronger every year and the splendid work done for the industry during the war is being succeeded by just as good work during peace time. The association has accomplished much for the motor truck dealer, its biggest accomplishment being the reduction of the chassis tax, which has saved the dealer thousands of dollars. Checking of adverse legislation has also been one of its biggest works.

Fred W. Vesper, the retiring president, has made a record that will be hard to equal, and steps down from his office with the profoundest good wishes of the entire industry. Mr. Harper, the new president, is owner of the Harper-Overland Company in Philadelphia, is a very successful dealer and should make a fine executive of the N. A. D. A. He has associated with him a very able board of directors and the future of the association looks very secure.

Manager Harry G. Moock has accomplished wonders for the trade during the past year and is very properly continued in his office. He has covered the country from end to end, has assisted in organizing several state and local associations, and the industry is to be congratulated that he is retained as manager for the coming year.

Engine Specification Tables

For the convenience of the trade we have compiled detailed specifications of all standard makes of motor truck engines. This table will appear in our March issue.

Georgia Dealers' Association Elects Officers

At its annual meeting held at Atlanta, Jan. 21, the Georgia Automotive Dealers' Association elected the following officers:

William L. Mathers, Atlanta, President; D. M. Lyon, Augusta, first vice-president; A. S. Hatcher, Macon, second vice-president; Tom Wisdom, Chipley, third vice-president; J. H. Lewis, Atlanta, fourth vice-president; R. H. Martin, Atlanta, treasurer; T. A. McGahee, Atlanta, executive secretary. Directors were elected as follows: John Lottridge, Atlanta; L. H. Dimmitt, Savannah; Joe Davis, Albany; T. M. Walden, Fitzgerald; W. T. Heard, Columbus; J. P. Nichols, Jr., Griffin; W. H. Field, Cartersville; W. C. Denny, Americus; Ned Pendergrass, Jefferson; Lee Jordan, Milledgeville; V. L. Williams, Waycross; W. E. Vann, Swainsboro.

The association, organized last June at Macon with 77 charter members, now has a membership of 359 and has established permanent offices at 305 Connolley Bldg., Atlanta, with Mr. McGahee as secretary and manager in charge.

A very helpful day's program was given at Atlanta, and plans were made to make the association of great value to its members during the coming year.

Norfolk Now Has Dealers' Association

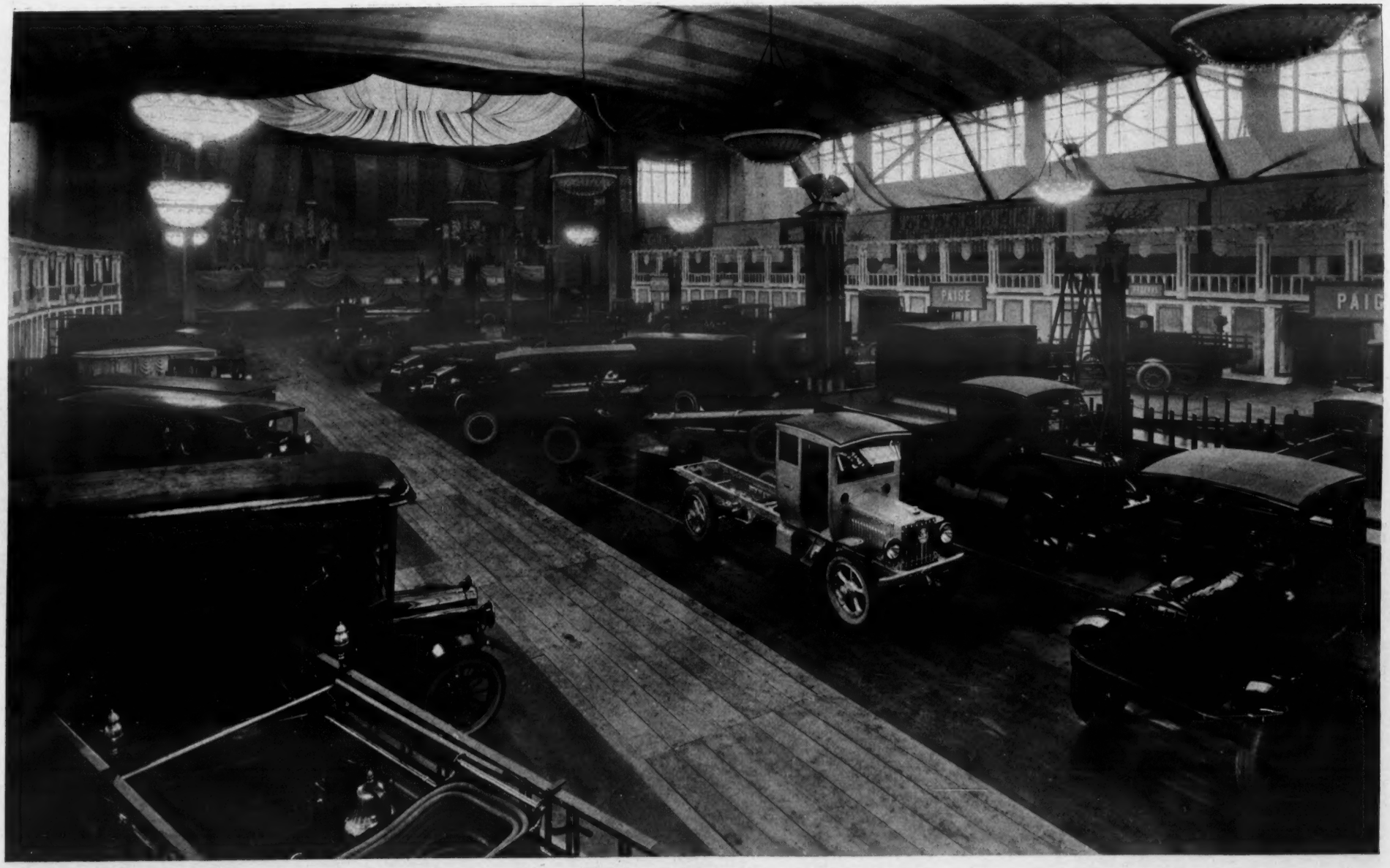
Norfolk, Virginia, has joined the ranks of cities having a first-class dealer organization, the Norfolk Automotive Dealers' Association, having been organized at a meeting held January 16, with 61 present, representing every element in the trade in that hustling distribution and sales center. The officers follow:

President, Arthur W. Depue, vice-president, J. R. McCallum; secretary, Ellis Loveless; treasurer, George Mason Smith.

The organization will have dues of sufficient size to make accomplishment of real good to the industry possible, and will sponsor an automobile show as one of its first acts.

N. A. C. C. to Move

NEW YORK CITY, Feb. 4.—Plans are now complete for moving the headquarters of the National Automobile Chamber of Commerce from its present headquarters at 7 E. 42nd St. to the new Marlin-Rockwell Bldg. at Madison Ave. and 46th St. This will take place about May 1st. The fourteenth and fifteenth floors of the new building will be occupied and are of such size as to permit of expansion as well as the having of a board room which will seat 225 people. This room will be offered to other associations for a meeting place and will, in so far as possible, be made central headquarters for all automobile affairs. Larger headquarters have been made necessary by the rapid growth of the present work and by the many new activities which have been scheduled for the coming year.



General View of the International Amphitheatre in Which Chicago's National Motor Truck Show Was Held

Additional truck exhibits were located in a number of annexes which communicated with the main pavillion. The equipment exhibits were located both above and below the balconies

United States Motor Truck Co. Brings Out New Line

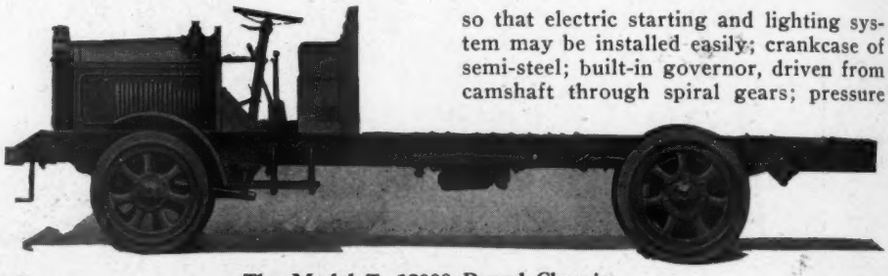
MOTOR truck dealers from all over the United States who visited the Chicago Show, and who strolled through the lobby of the Hotel Sherman during their week's stay, were surprised to see an entirely new line of United States motor trucks on exhibit in the latter place, in surroundings quite unusual to a motor truck exhibition. Naturally the exhibit attracted much attention, for when a successful motor truck manufacturer redesigns his entire line and places them on exhibition where they may be gone over in minute detail by manufacturers and the trade alike, the industry is going to take particular notice—which it did.

Since 1912 this company has made practically no changes in its line. So well were the models of that year developed, that even at this date the company has been selling all it could possibly turn out in its factory at Cincinnati.

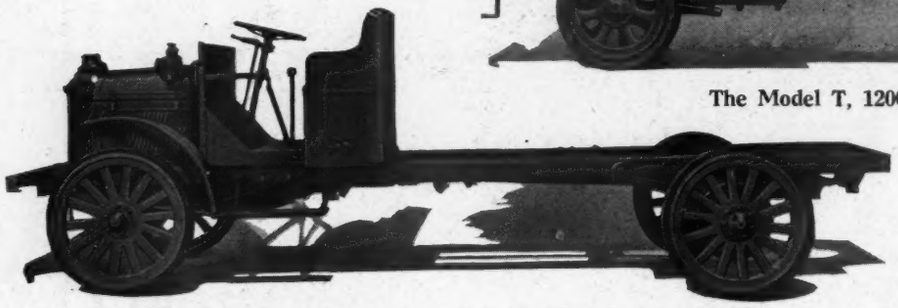
During the war the company built Class B trucks, and the experience gained in that work, coupled with the experience gathered from the whole field of war transportation, suggested to the executives and engineering forces that a complete redesigning of the line was now in order, using the best of all improvements developed during the war and before, and retaining all the fundamental excellence of design that has made their trucks dependable transportation units in the past.

The task was undertaken by E. C. Shumard, chief engineer of the company, and he was assisted by R. W. Bond, assistant chief engineer, and the new models they have turned out have won immediate recognition from the trade. The new line comprises trucks from 1½ to 6 tons capacity, a complete line presenting many unusual points of interest. The entire line is designed with a view to using pneumatic tires successfully, at the option of the owner.

In the original line of United States motor trucks the "floating power plant" was one of the outstanding features, this consisting of the engine, flexibly mounted in a sub-frame, consisting of short channels, resting between the main frame forward. In the new line the "floating" principle is still retained, though the sub-frame has been done away with, and the engine is cradled between springs at the rear instead of forward, as in the past.



The Model T, 12000 Pound Chassis



Side View of the One and a Half Ton United States Model

The New Spring Perch Used on All United States Models

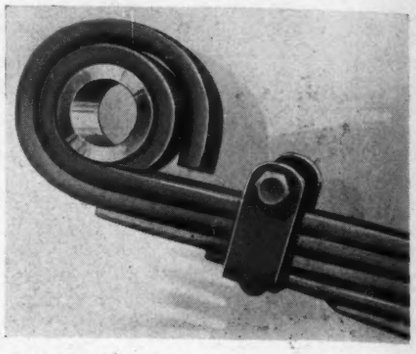
Wider engine arms are used at the rear, and the tips of these are held suspended between coiled springs, which in turn bear between brackets riveted rigidly to the main side frames of the truck. On each side are four of these coiled springs, two above and two below the engine arm, so that the engine practically "floats" between them.

The forward end of the engine is supported only at the center, suspended from a cast cross member resting on brackets riveted to either side frame. This gives the flexible three-point suspension considered necessary to relieve the engine from all twisting strains as the truck passes over uneven ground.

Because of this change from the old type of sub-frame, it is now possible to use engines with enclosed flywheel.

Engine Details

The engine used in the new series is built by the Hinkley Motor Co. and follows Class B truck engine standards in many respects. It is of L-head type, and is fitted with the same "Ram's Horn" hot spot manifold used on Class B truck engines during the war. Other special features of the new engine are toothed gear ring on flywheel, so that electric starter may be attached with a minimum of labor; generator mounting at forward end, so that electric starting and lighting system may be installed easily; crankcase of semi-steel; built-in governor, driven from camshaft through spiral gears; pressure oiling system fed from gear driven pump, with used oil passing through fine screen to sump before being used again; U. S. Army type oil gauge; crankshaft heat-treated and drilled for oiling; connecting rods of carbon steel, heat treated; camshaft case hardened with three bearing support and with rear end fitted with spiral gear for driving oil pump and governor; helical gears of extra face width in gear train, high tension Eisemann magneto with impulse starter.



Two Spring Leaves Encircle the Spring Hanger Bushing

In case of breakage of the top leaf, the second leaf prevents dropping of the frame

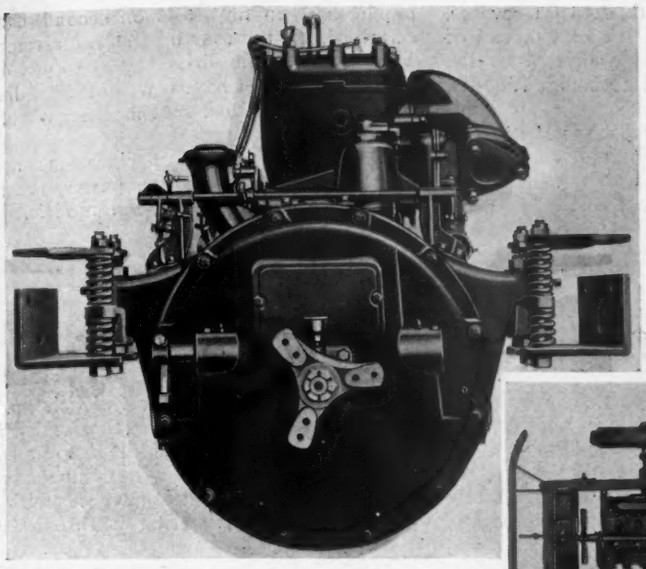
On the 1½-ton models a unit power plant is used, with the transmission gears and clutch housed integral with the engine. On the larger types the transmission is mounted amidships, with shaft from engine driving through fibre universals. Steel universals are used on the propeller shaft.

A multiple disk clutch is used on all models, the number of plates varying in the several models.

Three and Four-Speed Transmission

Three speeds forward and reverse are provided in the smaller models while four speeds and reverse is standard with the larger sizes. Where transmission is mounted amidships the front end is swiveled in a frame cross member, so that no strains will be set up in the gear train, due to twisting of the frame. All transmission bearings are taper roller.

The lever set is an entirely new design, greatly simplified. The levers are mounted in the center of the frame, bolted to the frame cross member stiffened by diagonal brace.



Rear of the Engine and Engine Mounting.

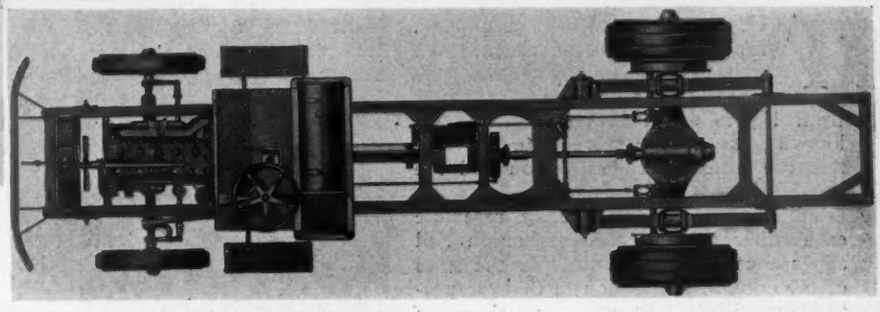
The spring suspension or "floating power plant" feature is here clearly illustrated. This construction is used on all models.

The radiator used on the new line is a complete departure from previous models used by the company, including cast iron shell complete, with vertical cooling tubes of ⅜-in. copper, each surrounded by helical cooling fins.

A three-piece engine hood is used, and rolled channel bumpers are riveted to all models.

An all metal cab, designed and built by R. C. Stewart, president of the company, and built by the Stewart Iron Works, is standard equipment, and the spring lamp brackets designed by Mr. Shumard and

A detail of the transmission in the new models that will be of great value is the provision for power-take-off for use in hoisting or unloading devices, and there is also provision for attachment of the standard S. A. E. air pump, a very necessary device with pneumatic truck tires.

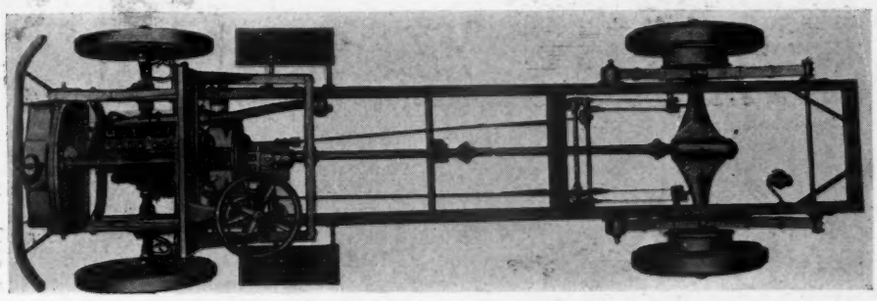


Model T, 12000 Pounds Capacity, the Largest U. S. Model

first used on special mail trucks built for the government, are now standard on the new line.

Brief specifications of the new line of United States motor trucks follow:

Models NW, 1½ tons and NP, 4000 lb.: Motor has four cylinders 3¾ x 5, giving 25 hp. at 1400 r.p.m. Frame 5 in. deep, flanges 2½ x ¼ in. thick steel. Speeds in m.p.h., 7.52 on first, 14.95 on second, 25.10 on third, 5.77 on reverse. Wheelbase 144 in., driver's seat to end of frame 120 in. Chassis weight 3800 lb. Body weight permitted 1050 lb. Wood wheels standard.



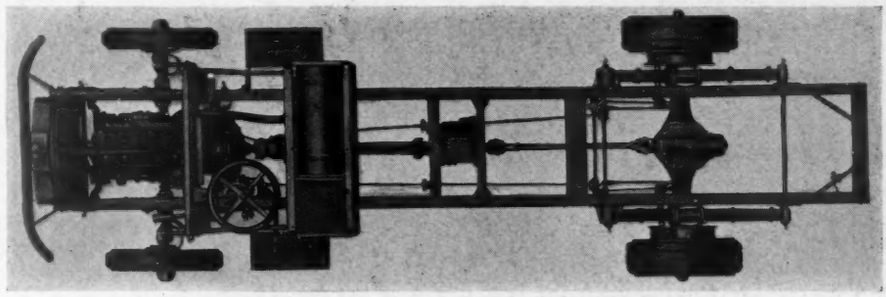
Model N W, One and a Half Ton Capacity

The same brake equalizer is in use as in previous models, the clever modification of the rear axle differential principle that has worked out so well in the past. This gives positive equalization of brake pressure in the simplest possible manner.

Worm drive is used on all models, with standard front and rear axles of the latest type and of most modern design. Braking surface is extra large, insuring safety in handling the heaviest loads on steepest grades.

Hotchkiss drive is used as in the past, but the new rear spring mounting, designed to prevent any possibility of spring slippage, due to thrust, is unique. There is a cup depression pressed in each spring, making a protruding boss on the opposite or bottom side, which nests in the cup boss of the spring below. The bottom spring leaf fits into a depression in the base of the spring perch, and the spring cap has a boss fitting into the depression in the top spring. The spring perch is of a new, box type, with side plates, top and bottom, which are clamped to the axle by two heavy nickle steel clips, the whole, when tightened down, forming almost an integral part of the axle itself.

Each rear spring has four rebound clips. The two top leaves are bent around a brass bushing, which takes the spring bolt, which is ground to fit.

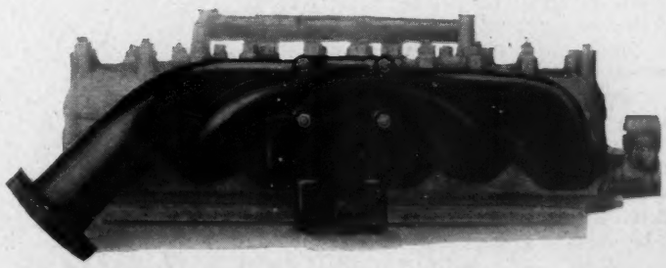


U. S. Chassis Model S, 8000 Pounds Capacity

The frame and cross members are all of pressed steel, hot riveted.

Steering gear is of the worm and nut type used in U. S. motor trucks for years.

Model R, 6000 lb. capacity: Motor has four cylinders 4 x 5¼ in., giving 35 hp. at 1200 r.p.m. Frame 6 in. deep, flanges 2¾ in., thickness ¼ in. Speed in m.p.h., 3.61 on first, 6.07 on second, 9.8 on third, 17.3 on fourth, 3.05 on reverse. Wheel-



Intake and Exhaust Manifold Arrangement on the U. S. Models.

base 156 in., driver's seat to end of frame 144 in. Chassis weight 5200 lb. Body weight permitted 1350 lb. Wood wheels standard.

Model S, 8000 lb. capacity: Motor has four cylinders 4½ x 5½ in., giving 42 hp. at 1200 r.p.m. Frame 7 in. deep, with 3-in. flange of steel ¼ in. thick. Speed in m.p.h., 2.59 on first, 4.43 on second, 7.10 on third, 12.5 on fourth, 2.16 on reverse. Wheelbase 168 in., driver's seat to end of frame 156 in. Chassis weight 7000 lb., body weight permitted 1600 lb. Wooden wheels standard.

Model T, 12,000 lb. capacity: Motor has four cylinders 4¾ x 6½ in., giving 50 hp. at 950 r.p.m. Frame 9 in. deep with 3¼ in. flange of steel ¼ in. thick. Speed in m.p.h., 2.07 on first, 3.88 on second, 6.89 on third, 11 on fourth, 1.71 on reverse. Wheelbase 172 in., driver's seat to end of frame 168 in. Chassis weight 9200 lb., body weight allowed 1800 lb. Steel wheels standard.

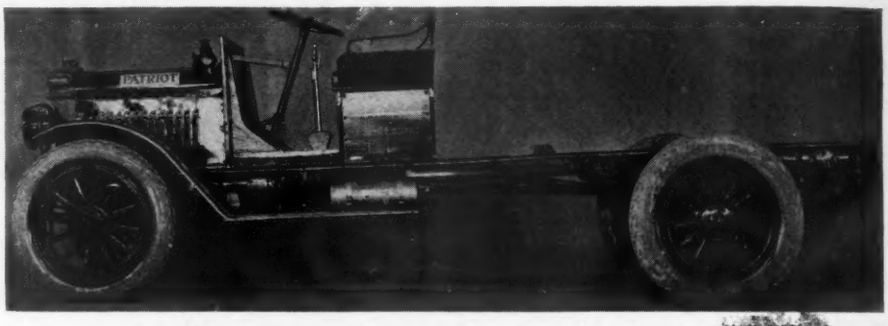
The Farm Special specifications are practically the same as to power, measurement, etc., as the 1½-ton models.

Patriot Line Consists of Three New Models

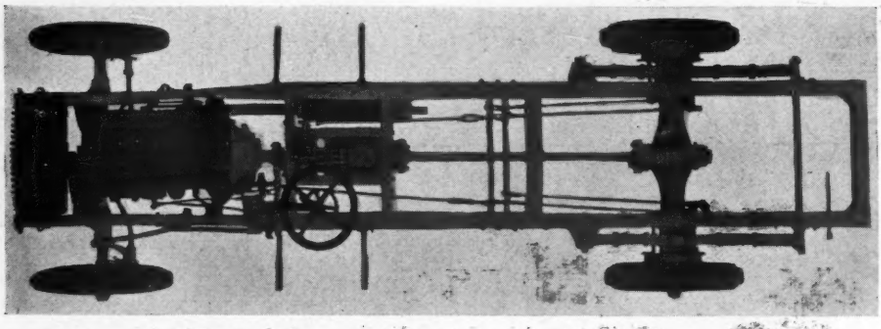
THE Hebb Motors Company, Lincoln Neb., is offering to the trade a new line of trucks, consisting of three models, ranging from 1¼ to 3¾ tons capacity and are known as the Revere Model 1¼-ton, the Lincoln Model 2½-ton and the Washington Model 3¾-ton.

These three models greatly resemble each other in general construction and appearance, differing mainly in the sizes of the units in proportion to their respective capacities. Inasmuch as they are assembled along the same general lines, a description of the Revere, the latest addition, will in a general way also apply to the larger capacity models.

The Continental engine, which is employed in the Revere Model, represents the main difference between this model and the other two models, where engines of Hinkley make are used. The engine is a 4-cylinder "L" head type with a bore and stroke of 3¾ in. x 5 in., respectively and capable of developing 2.5 hp. It is carried on a three-point suspension and can be readily removed from the chassis for repairs.



Side View of the Patriot With Pneumatic Equipment



Plan of the Patriot Chassis. The Three Models Are Similar in Construction

Power is transmitted through a Covert multiple-disk dry-plate clutch, which is mounted in the flywheel and completely inclosed in a standard S. A. E. bell housing. This clutch is featured by siphon wick-oilers, which lubricate the clutch bearings and require filling only every 2000 mi. The transmission is a Covert four-speed, mounted amidship, carried on a sub-frame and operated by a control-set separately mounted. The gears are of the stub tooth type, heat-treated. The main shaft on which the gears ride is splined and both the main and countershaft are of nickel steel, heat-treated and carried on annular ball bearings. Final drive is through a two-piece Empire axle. The mounting of the worm gear and differential is accomplished by dropping into place and bolting the housing together and is carried on annular ball bearings. The shafts are splined at both the differential and rear end and are semi-floating, being carried on double row annular ball bearings. The differential is the Brown-Lipe-Chapin four pinion type, having large driving shafts of nickel steel, heat-treated. The differential is inclosed in a cast steel housing. The gear ratio on high is 6 to 1 and the total gear reduction on low is 21.72 to 1.

The drive from the clutch to the transmission and from the transmission to the rear axle is through Snead propeller shafts with Hardy-Thermoid flexible couplings. The shafts are of alloy steel tubing, heat-treated and the spider ends are forgings heat-treated and balanced. The drive and torque are both taken through the springs which are of alloy steel and flat under normal load.

The cooling fluid is circulated by a thermo-syphon system. The radiator which is constructed with the top and bottom integral and with removable cores, is mounted on heavy coil springs. Ignition is by distributor with magneto type of battery which have been supplied by a battery which is always fully charged by the generator. Carburetion is by a Stromberg, gas being admitted to it by Stewart vacuum system with manual control on top of the steering wheel and by foot accelerator. Steering is through a Ross worm-and-gear with column set at a convenient angle at the left side.

Lubrication is by geared pump located in the bottom of the oil pan from which the oil is forced by high pressure to the bearings through the drilled crankshaft. The chassis lubrication is by self-lubricating bushings and by wick-oilers which require filling only every 2000 mi.

The wheels are of the artillery type and are equipped with 35 x 5 in. pneumatic cord tires both rear and front. The brakes are both internal and external, expanding uniformly on a pressed steel drum.

The service brakes are operated by a foot pedal and the emergency by a hand lever. All levers and pedals operate on shafts that are fitted with self-lubricating bushings that require no attention.

The wheelbase is 129 in., loading space, 96 in., and tread, 56 in.

Heavy steel fenders which are fitted into heavy forged sockets are used. The equipment includes: Electric lighting and starting, dimming switch, electric tail light, lighting and ignition switch, air choke or pressure gage, ammeter, electric horn, tire and jack pump.

Indiana Exhibits Complete Line

The Indiana Truck Corp., Marion, Ind., showed its complete line, including its 1¼-, 2-, 2½-, 3½- and 5-ton models. The display also included the "Helomido," the specially outfitted truck with which Mr. C. G. Barley made an overland trip to California.

The Melton-Haury Engine

A NEW engine of single sleeve type and designed for either truck, passenger car or tractor use has just been announced by the Single Sleeve Motors, Inc., 814 Hearst Bldg., Chicago. This engine, known as the Melton-Haury engine, is the result of six years of earnest effort on the part of Geo. W. Haury, to perfect a single sleeve valve engine.

In February, 1919, the Single Sleeve Motors, Inc., was formed, which is officered as follows: President and manager, F. L. Mead; vice-president and chief engineer, L. L. Melton; secretary and treasurer, Harry V. Greenwood.

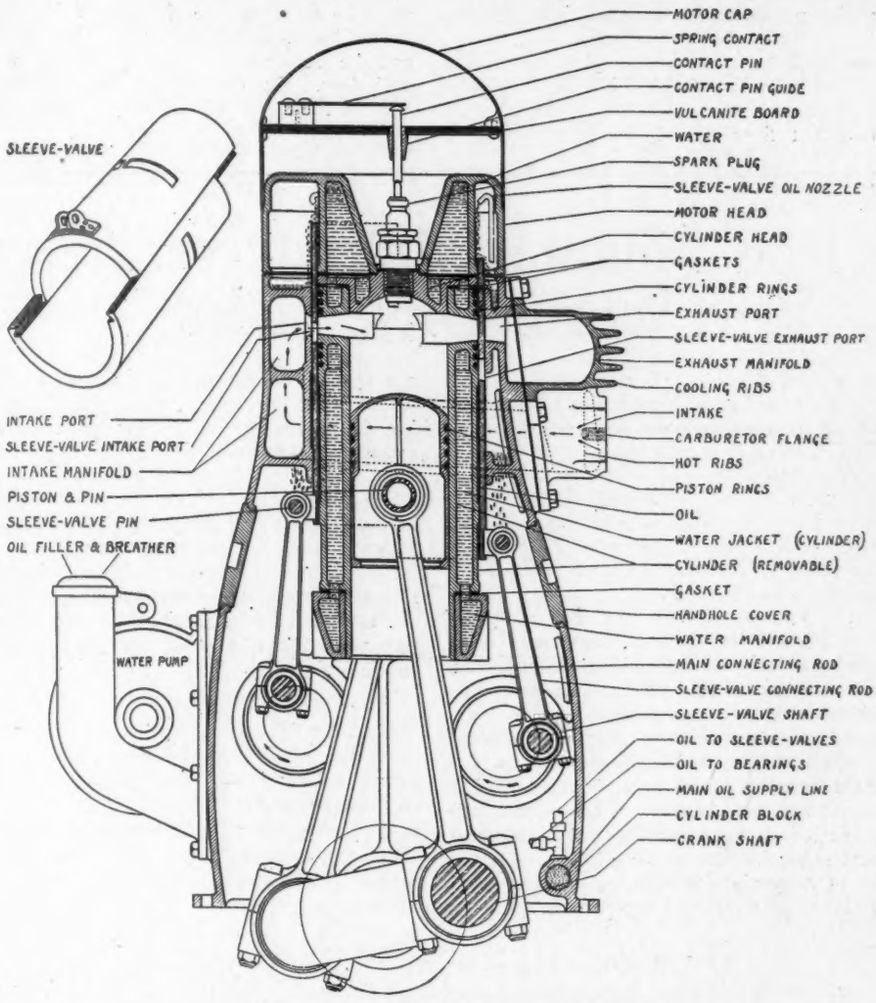
In going further into the merit of the Melton-Haury engine, the most striking feature is the location of the sleeve valve, which is located outside of the cylinder with the usual amount of water cooling area found in the ordinary type of engine, this feature being one of the results of the company's efforts in making this type of engine commercially practical.

The engine is extremely clean-lined. The water pump and magneto are located on the intake side and are mounted close against the block and are driven through helical gears. On the exhaust side there is the exhaust manifold with hot points protruding downward into the intake manifold, against which the carburetor is attached. The gases, being pre-heated, pass through the block between the cylinders into the distributing manifold inside of the engine block. A spirally driven oil pump driven from the valve shaft with by-pass provided, giving positive oil pressure control, is also located on the exhaust side near the base of the engine.

The single sleeve valve, as a study of the drawings will reveal, is a cylindrical structure with port openings of extra large area properly placed for correct valve timing. The cylindrical structure, being split longitudinally, must of necessity be sealed at that point. This is accomplished by a dove-tailed edge that effectually seals this joint. This feature is the result of many and trying experiments by the inventor, Geo. W. Haury.

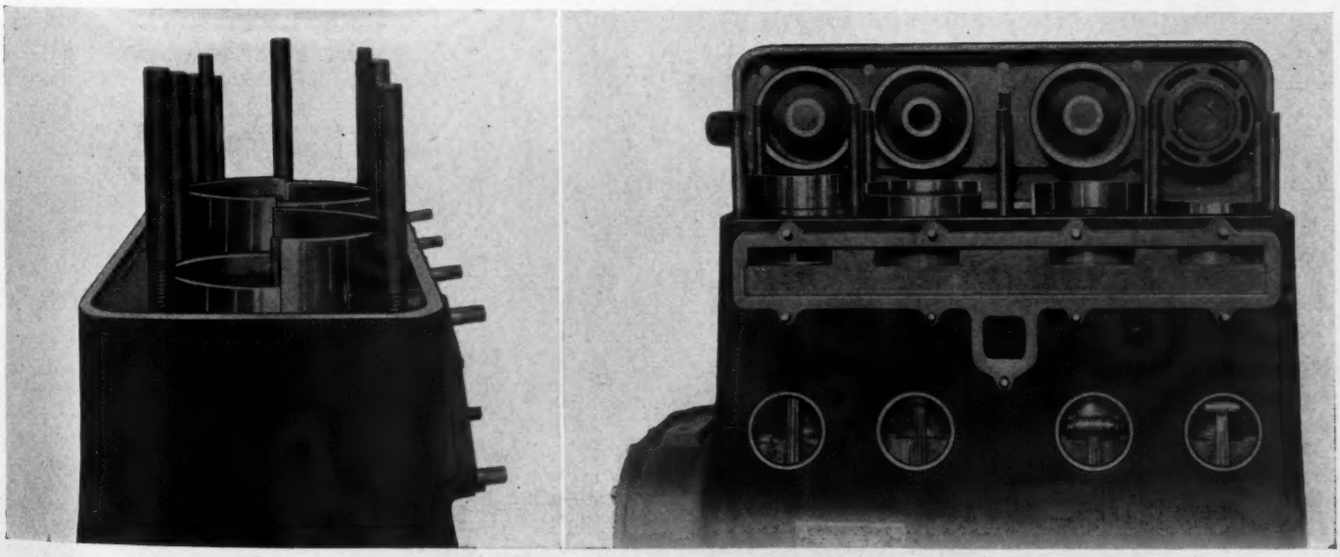
From the sectional view shown of this engine it will be noticed that the cylinders are removable, being machined inside the same as any other engine, with a minimum of friction surface on the outside, against which valves travel with a corresponding bearing surface integral with the block.

The operation of the valves is positively furnished by individual valve shafts driven by helical gears, the location of



Sectional View of the Melton-Haury Engine

The construction of the sleeve valve and its location are here plainly seen. It will be noted that the cylinder is well cooled, while the sleeve valve is amply lubricated. The cylinders are removable. Increased valve port area with full opening during two-fifths of the stroke, reduction of sleeve valve friction, etc., are some of the advantages claimed.



End and Side View of the Melton-Haury Engine

these shafts being directly below the driving lug on sleeve, thus reducing any side thrust or undue strain whatsoever. The cylinders are provided with individual removable heads that in turn are held in position and alignment by the engine head.

The oiling system is very positive, oil under pressure, controllable from two to fifty pounds, being forced to every bearing surface. Due to the location of the sleeve valve on the outside of the water jacket, and the same working under a constant flow of oil, under pressure, it will be noted that the firing heat against the sleeve is reduced to a minimum.

In this engine accessibility has been given special consideration. Handhold plates on the sides of the engine are provided for each of the valve connecting rods, through which the rods may be disconnected from the sleeves, and by the use of one wrench and screw driver the entire upper construction of the engine can be removed, including sleeves and cylinders. In the lower or crankcase section the same accessibility is also provided.

Iron Mountain Introduces New Worm Drive Axles

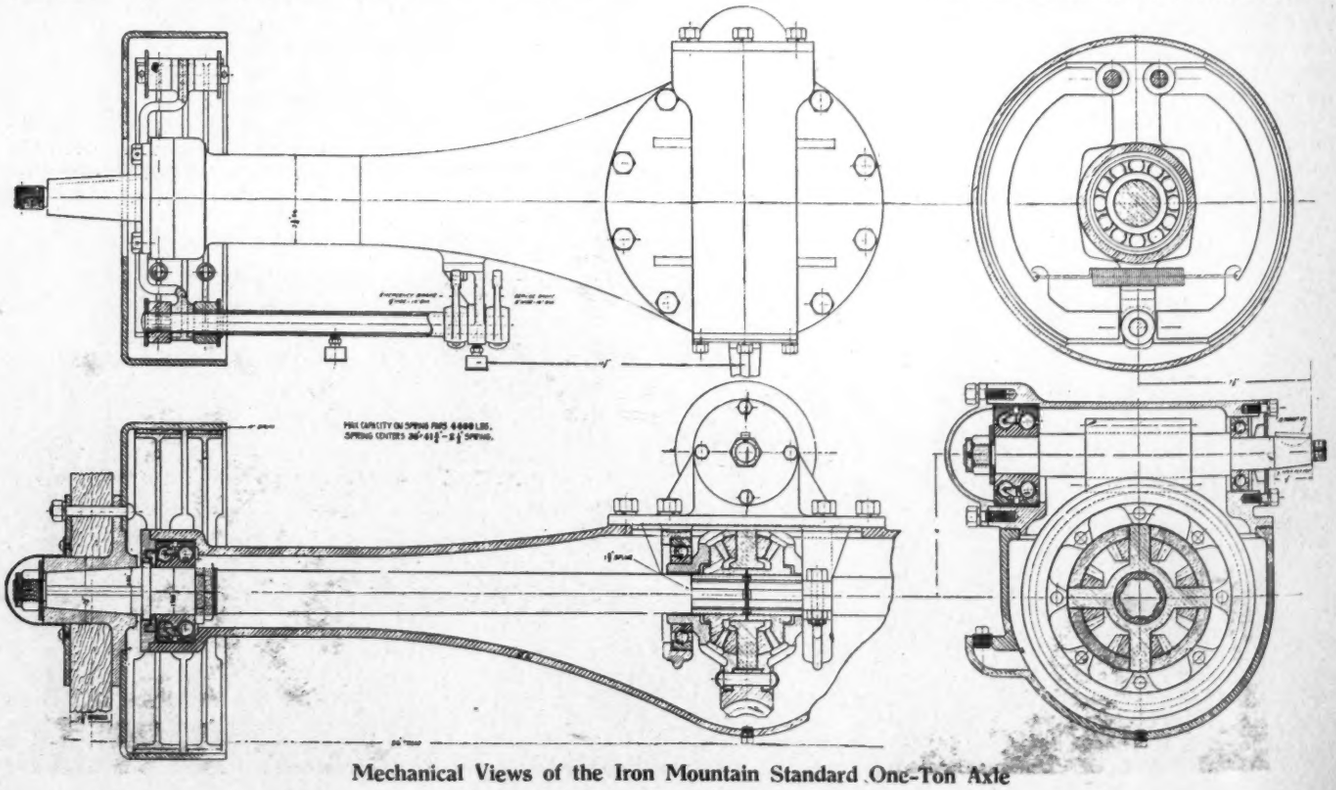
A NEW axle of the semi-floating type and known as the Iron Mountain Axle was exhibited for the first time by the Iron Mountain Co., 927 E. 95th St., Chicago, Ill., at the Chicago Truck Show. The wheel bearing construction of this axle is carefully designed and the entire assembly is featured by few parts, light weight and strength.

The housing of this axle is a one-piece steel casting. Its design insures maximum strength for a given weight of materials, distributing it over the entire unit uniformly. The worm drive assembly is a complete, self-contained unit, combined in a rigid carrier, attached directly to the main housing, and is easily removable for inspection or repairs. The worms are made of steel, carefully machined and heat treated. The worm wheels are made up of a special formula of bronze. Ball bearings of approved type and ample size are used throughout. The thrust in the worm shaft is taken care of by self-aligning ball bearings with a large oversize capacity. The shafts are forged nickle steel, heat treated, machined and ground. They are splined at the center and securely locked into the proper position at the outer bearings, thereby preventing any lateral motion. Easily adjusted, double internal expanding brakes are used. They are assembled so that they do not interfere with the wheels or any part of the running gear.

The lubricating system embodied in this axle is simple. A supply of oil is contained in the bowl in the main housing at the center and is carried up and distributed by the worm wheel to the various parts, the excess oil returning to the bowl. The only attention required is that a new supply of cylinder oil is provided at regular intervals.

The following is a brief resumé of the specifications of the three models:

Model M-1 for Fast Pneumatic Equipped Trucks.	
Overall Length	63¼ in.
Tread	56 in.
Spring Centers—3-in. Springs	36-40½ in.
Housing—Fore and Aft	3¾ in.
Standard Ratio	6 1-5
Optional Ratios	7¾
Diameter of Brakes	14 in.
Width of Brakes	1½ and 1¾ in.
Hub Flange Diameter	8 in.
Hub Barrel Diameter	2¾ in.
Spoke Width	1¾ in.
Diameter of Hub Bolts	7-16 in.
Diameter of Hub Bolt Circle	6⅝ in.
Number of Hub Bolts	Optional
Brake Lever Eyes	⅜ in.
Worm Shaft End Diameter	1⅜ in.
Maximum Weight on Tires	3500 lb.
Net Weight	
Model A-10, the Standard 1-ton Axle.	
Overall Length	63¼ in.
Tread	56 in.
Spring Centers—3-in. Springs	36-40½ in.
Housing—Fore and Aft	3¾ in.
Standard Ratio	6 1-5
Optional Ratios	7¾
Diameter of Brakes	14 in.
Width of Brakes	1½ and 2 in.
Hub Flange Diameter	8 in.
Hub Barrel Diameter	2¾ in.
Spoke Width	1¾ in.
Diameter of Hub Bolts	7-16 in.
Diameter of Hub Bolt Circle	6⅝ in.
Number of Hub Bolts	Optional
Brake Lever Eyes	⅜ in.
Worm Shaft End Diameter	1⅜ in.
Maximum Weight on Tires	4400 lb.
Net Weight	
Model A-15-X, the Standard 1½-ton Axle.	
Overall Length	64¼ in.
Tread	56 in.
Spring Centers—3-in. Springs	35-40½ in.
Housing—Fore and Aft	4¼ in.
Standard Ratio	7¾
Optional Ratios	
Diameter of Brakes	16 in.
Width of Brakes	1¾ and 2 in.
Hub Flange Diameter	9 in.



Mechanical Views of the Iron Mountain Standard One-Ton Axle

Hub Barrel Diameter	3¼ in.
Spoke Width	2 in.
Diameter of Hub Bolts	7-16 in.
Diameter of Hub Bolt Circle	7½ in.
Number of Hub Bolts	Optional
Brake Lever Eyes	⅜ in.
Worm Shaft End Diameter	1⅜ in.
Maximum Weight on Tires	5400 lb.
Net Weight	

Morand Cushion Wheel

The Morand Cushion Wheel Co., Chicago, Ill., exhibited a complete line of cushion wheels for all capacity trucks at the Chicago Show. Trucks equipped with these wheels are said to ride smoothly and afford easy running action, which reduces the vibration and protects the mechanism from road shock.

Cutaway View Showing the Assembly of the Morand Wheel

The main source of resiliency is obtained from a rubber cushion so constructed as to be incased by channel bands on both the inner and outer circumference. Both sides of the rubber cushion is protected by a rubber gasket which is bolted at the top and bottom through the steel channel into the rubber cushion. This entire element which is embedded between the rim and felloe makes a compact and resilient assembly. This wheel is claimed to give resilience not only at the point of contact but throughout the entire circumference of the wheel.

The wheels are built complete to S. A. E. specifications for pressed-on type tires only, in sizes from 32 x 3½ single to 40 x 14 dual for any size or make of truck. They may be obtained complete in either wood or steel.

Eberhard Body Irons

The Eberhard Mfg. Co., Cleveland, O., had a very interesting exhibit, consisting of a specially built rack body upon which were mounted and properly labeled a great many of the malleable iron fittings which this company supplies to the body builders. Various fittings were shown that were novel in that they could be used in numerous ways, as, for instance, the rack body locks which can be utilized for either side locks or corner locks, without removing the fittings but simply reversing the racks.

Schacht Ten-Speed Transmission

Among the animated exhibits probably none drew more attention than did the Schacht display, at which was demonstrated the Schacht ten speed transmission on a 5-ton model. With this transmission a vehicle speed of 30 m.p.h. can be obtained with a 5-ton truck at an engine speed of 1000 r.p.m.

In addition to the main gear shift lever an auxiliary gear shift lever is provided, the latter only having two movements, forward and backward. When the auxiliary lever is in the backward position, and which is the normal driving position, the operation of the main gear shift lever is the same as on any four-speed transmission and the auxiliary lever is only brought into play when negotiating hard, steep grades or when pulling through sand or mud or for any other condition when a greater reduction in power is required. For example: assuming that the truck is operating over a good level stretch of road on high gear and a grade is encountered necessitating the use of a lower gear, without disturbing the main gear shift lever, the operator simply disengages the clutch and pushes the auxiliary lever forward, immediately providing greater reduction. The principle of operation is the same when the main gear shift lever is in first, second, third or fourth speed—a double reduction in power is obtained by simply shoving the auxiliary lever forward which engages the auxiliary gears.

The prime object of this transmission is to eliminate excessive engine speeds and to provide more power on lower gears. The ratios obtainable with this transmission are as follows:

Final Gear Ratios

	Driving Through Main Gears Direct	Driving Through Auxiliary Gears
Reverse ...	6.1 to 1	7.22 to 1
First	4.75 to 1	6.56 to 1
Second ...	3.2 to 1	4.42 to 1
Third	1.72 to 1	2.37 to 1
Fourth	Direct	1.38 to 1

Transmission Gear Ratios

	Driving Through Main Gears Direct	Driving Through Auxiliary Gears
Reverse ..	65 to 1	77 to 1
First	50.7 to 1	70 to 1
Second ..	34.1 to 1	47.2 to 1
Third ...	18.4 to 1	25.3 to 1
Fourth ...	10 1-3 to 1	14.7 to 1

Napoleon Shows Farm Truck

The Napoleon Motors Co., of Traverse City, Mich., exhibited the Model 11, 1½-ton job, which is pneumatic tire equipped and which appeals especially to the farmer clientele. This company also builds a 1-ton job, Model 9. Outside of a few minor changes, the specifications of this model have not been changed since these mode's were described in the March, 1919 issue, page 90.

This company is also featuring the Economy steel combination dump and express body which has a capacity of 35 cu. ft. The dumping apparatus is hand operated and contains only two moving parts inclusive of the pulleys. It can be operated from either side of the truck. The hoist does not interfere in any way with the express feature and no change of any kind is necessary when the truck is used for dumping work. This outfit includes a reversible tail gate, fitted with a sliding scuttle door for discharging part loads. This body is designed especially for the small contractor and farmer. Napoleon trucks can be had with convertible cabs.

Hall Sport Special

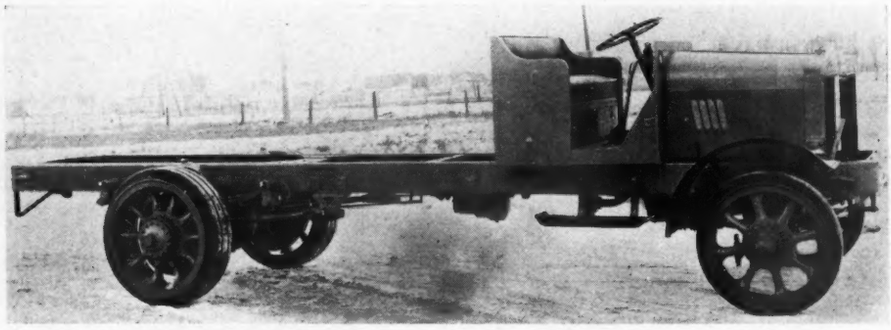
The Lewis-Hall Iron Works, Detroit, Mich., exhibited a special model designed for narrow streets. This truck is designed especially for city building where a truck is needed that can be easily manipulated in narrow streets and alleys. This truck is built along the general lines of the Hall 2-ton job and differs only in that it permits of a short turning radius.

New Model K, Three and a Half Ton Dorris Truck Seen at the Chicago Show

This truck incorporates standard units such as Bosch magneto, Stromberg carburetor, Timken-David Brown worm gear rear axle, Duplex brakes and Ross steering gear. The engine is the Dorris perfected valve-in-head, with an N. A. C. C. rating of 28.9 hp. and 1090 r.p.m. The governor is also of their own manufacture, being of the flyball type. The standard equipment includes oil, side and tail lights, hand operated horn, set of tools, jack, tool box, lock and driver's seat with spring cushion complete. The price is $4,200 f. o. b. St. Louis, Mo.

Oneida Shows Gasoline Trucks and New Electric

At both National Truck Shows the Oneida Motor Truck Co., of Green Bay, Wis., exhibited for the first time its line of gasoline trucks in five models, viz.: 1¼-, 1¾-, 2¼-, 3½- and 5-ton capacity. Particular interest was created by the



The Oneida Gasoline Job Made in Five Models

new Oneida Unit Drive Electric truck, being made at present in 2-ton size, a detailed description of which will appear in an early issue.

The Oneida company has launched an extensive building program at the factory in Green Bay, Wis., and has assembled an organization, which, from the standpoint of automotive engineering, manufacturing, and sales experience, offers a most reassuring record.

The New Hendrickson Truck Crane Company

A truck crane, capable of lifting from 500 to 10,000 lb., known as the Hendrickson truck crane, was exhibited at the show by the Hendrickson Truck Crane Co., Peoples' Gas Bldg., Chicago, Ill. This crane is made in numerous sizes to fit trucks of different capacities. They are made in two types, type A and type B. Type A is equipped with a screw adjustment and type B with a pin adjustment. They are also equipped with a high speed hoist and trolley. It is so constructed that the beams can be leveled by means of an adjusting device at the front end. Provisions have also been made for locking the load at any point on the beam by means of a brake on the trolley.

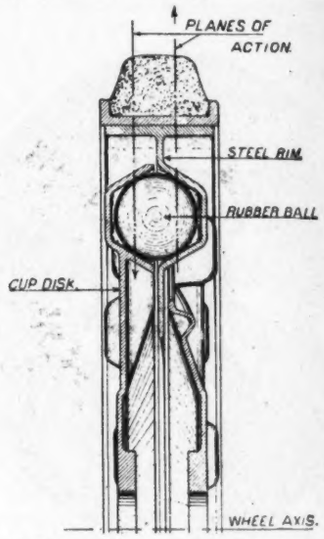
Model B, which is equipped with the pin adjustment, permits the extension of the beam forward when it is necessary to bring the rear end of the truck flush with a wall or an exceptionally low doorway. Conversely, the beam may be made to extend beyond the rear of the truck. This is a feature than can be appreciated when it is necessary to transfer a load over a fence or other obstacle onto the truck.

The Hendrickson truck crane can be attached to any motor truck by any mechanic, as all the necessary equipment is provided with which to attach it. The prices and the minimum distance between hook and under side of beam and size of I-beam vary in relation to the capacity of the hoist. The prices of the type A crane range from $350 for the 500 lb. hoist to $700 for the 5-ton hoist. The prices of the type B crane, which is provided with a pin adjustment, is also dependent upon the capacity, ranging in price from $300 to $650.

No-D-Lay Resilient Wheel

A full floating elastically suspended wheel represented the attraction at the booth of the Ellis Resilient Wheel Corp., Hoge Bldg., Seattle, Wash. It is known as the No-D-Lay Resilient Wheel. When equipped with ordinary solid tires it is claimed to provide exceptional smoothness of action and cushioning qualities.

The front wheels consist of three principal parts, the steel rim and two cup disks, the latter corresponding to the spokes in the ordinary wheel. Contact between the cup disks and the steel rim is accomplished by rubber balls. The steel rim is of "T" section and in the web of the "T" is a series of conical cups arranged in a circle concentric to the axis of the wheel. These cups face alternately in opposite directions. The cup disks are provided with similar cups, each disk having one-half as many cups as the rim. When this wheel is assembled the cups of the steel web register with those of the two disks, forming little chambers into which are placed rubber balls. These balls represent the only connection between the axis and the tire. There are no bolts connecting the steel rim to the rest of the wheel as



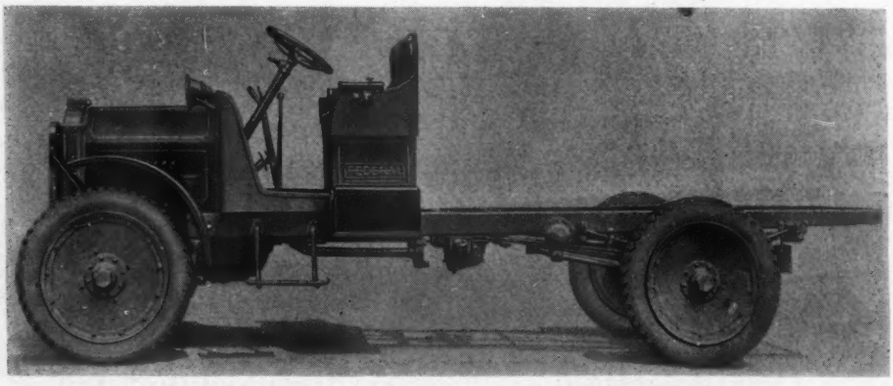
Sectional View of the No-D-Lay Resilient Wheel

the cup disks are mounted on the steel hub of the wheel and held together in the conventional way.

The rear wheels embody exactly the same principles that were set forth in the description of the front wheels. However, as they carry a much greater load two rows of balls are used, eighteen balls in each circle, making a total of thirty-six balls compared to fourteen balls in the front wheel.

Parker Shows One Model Only

The Parker Motor Truck Co., Milwaukee, Wis., exhibited at Chicago but one model, namely, their 3½-ton job, J9. The 2- and 5-ton models are practically smaller and larger editions of the 3½-ton size, all three jobs being practically a standardized product throughout. One of the features of this model is that it is made with standard tread. Particular attention is also called to the Parker rear axle which is of the full-floating David-Brown worm drive type, equipped with Timken taper adjustable roller bearings throughout. The axle housing is of three pieces, cast steel construction in which are used chrome nickel steel tubes of unusual size and which tubes are supported in such a manner as to produce a maximum strength throughout the entire axle construction. A sample axle of the type mentioned was shown. The makers recommend this model, when equipped with pneumatic tires, for hauling work.



Chassis of the New Federal One-Ton Truck

It was shown for the first time at the New York and Chicago National Truck Shows. The essential features are: A governor control speed of 25 m.p.h.; pneumatic cord tires; pressed steel frames; disk steel wheels; heavy support radius rods; electrical lighting equipment; special battery and generator; power tire pump and steel seat and dash.

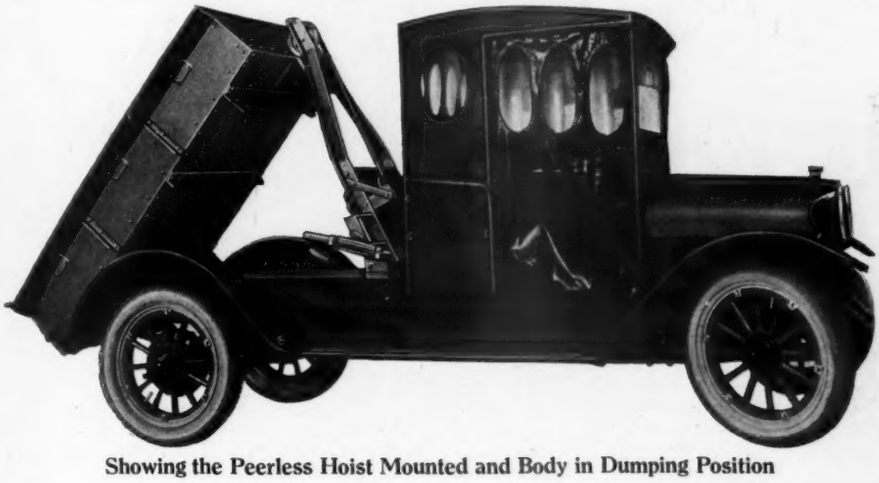
Auglaize Alsteel Dump Bodies Have Peerless Hand Hoist

THE Auglaize Motor Car Co., New Bremen, Ohio, exhibited its Alsteel dump body and peerless hand hoist. This equipment can be readily assembled to any type truck. The Peerless hand hoist which can be installed without drilling holes in the chassis frame, requires but from one-half to two minutes to raise the body to an inclined position of from 30 to 50 deg., depending entirely upon the load to be lifted and the length of the body.

Consideration has been taken in the design of the dump body for the minimizing of the effort required when loading with a shovel. For this reason the sides are built low. The body is also built short for cubical contents, depends upon the exact dimensions of the chassis upon which it is to be mounted. The standard lengths of this body are 6, 8, 10 and 12 ft., and standard widths, 44, 48 and 60 in.

The Peerless hand hoist is simple, light in weight and durable. The gears are incased to keep them free from dust and dirt. It is built to fit any chassis and any style of body. When mounted the hoist occupies only 10 in. on a chassis, directly behind the driver's seat. Power is transmitted through a single cable, which makes for more uniform pulling.

The Peerless hand hoist is made in three models, A19, B19 and C19. They have capacities of 2500, 5500 and 12000 lb.,



Showing the Peerless Hoist Mounted and Body in Dumping Position

so that a maximum dumping angle of at least 45 deg. may be obtained. No provisions have been made for the rounding of the corners where the side panels join the platform, as this unit is also intended to haul materials of rectangular shapes. The sides are flared. The bodies are built of No. 10 gage steel and angle steel of sufficient size and weight to stand rough usage. The capacity of these bodies as respectively. The prices are $75, $90 and $135, respectively.

The prices of the Auglaize Alsteel bodies range from $200 to $237.50 f.o.b. New Bremen, Ohio, according to their cubical capacity which ranges from 60 cu. ft. to 100 cu. ft.

Small doors, without chutes, in side or tail gate, $7.50 each, extra. Portable swing partitions, $12 each, extra.

Clark Shows Complete Line of Internal Gear Axles

The first exhibit of a complete line of internal gear drive axles, from ¾ ton to and including 5 tons capacity, was made by the Clark Equipment Company, Buchanan, Michigan, at both the Chicago and New York Shows.

A 2-ton Clark axle on which the housing had been skeletonized and cut away, revealed to the visitor's eye the construction of the differential, pinion shaft and drive shafts. The axle was motor driven and mounted with Clark disc steel wheels equipped with 40 x 8 Firestone pneumatic tires. The disc in one wheel was also cut away, showing the pinion gear meshing with the internal gear ring.

An extensive exhibit of steel truck wheels was also contained in the Clark display, these wheels being for use with both pneumatic and solid tire equipment. Wheels for solid tires included the following: 5-ton Clark disc steel wheel, 40 x 6; 2-ton Nash Quad wheel, 36 x 5; 3½-ton Clark disc steel wheel, 36 x 5 dual; 5-ton Clark disc steel wheel, 40 x 6 dual rear, mounted with U. S. solid tires; 2-ton Clark pressed steel wheel, 36 x 3½; 3½-ton Clark steel spoke wheel, 36 x 5 dual rear.

Special wheels for pneumatic tires, which are forging to the front in motor truck usage, were represented in the exhibit by a 3½-ton Clark disc steel wheel, 44 x 10 rear, mounted with Goodyear detachable pneumatic tire and two 2-ton Clark disc steel wheels, 40 x 8 rear, mounted with Firestone demountable pneumatic truck tires. A wide steel road building wheel, size 42 x 18 for use on motor trucks engaged in road building was also displayed.

Mead Cushion Wheel

A new cushion wheel, known as the Mead Cushion Wheel, and designed to reduce the constant jarring and jolting experienced by trucks equipped with standard solid tires traveling over rough roads, was exhibited by the American Cushion Wheel Co., 7956 So. Chicago Ave., at the truck show.

The features of this wheel are its strength and light weight, which is possible with its simple construction. The cushioning element of this wheel consists

Interior Construction of the Mead Cushion Wheel

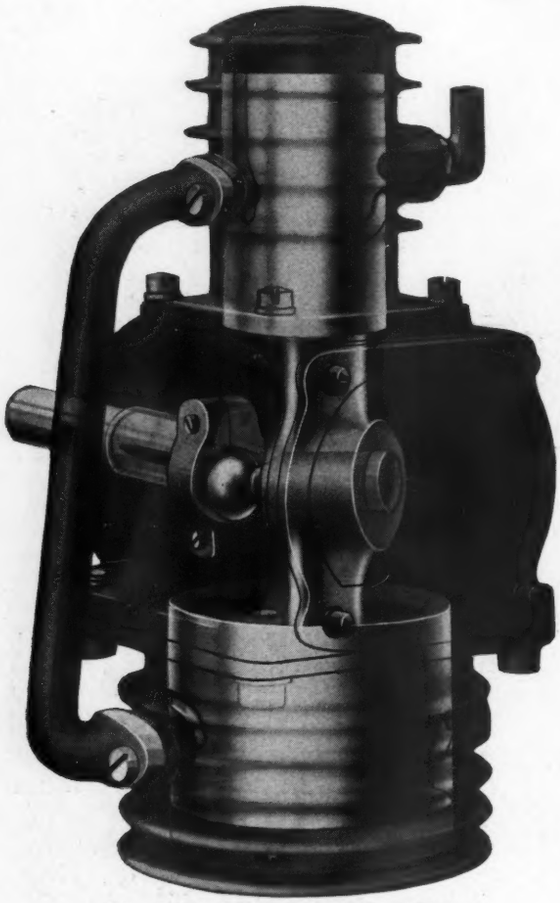
of a specially designed retaining band, known as the Mead Wheel Band, which is of "T" section and which positions two oblong sectioned rubber cushions. The cushions are securely encased by a retaining angle ring. This element is separated from the outer rim by a Standard S. A. E. band.

Automotive Trailer

The Automotive Trailer Corp., 1442 McCormick Bldg., Chicago, Ill., featured their trailer which consists of a fifth wheel steering arrangement in the front and a half elliptic spring suspended axle at the rear. This trailer is made in various sizes from 2 to 15 tons capacity and was described in our November, 1919 issue, page 54. The exhibit at the Chicago Show included a 3-ton and 5-ton job, also a 7-ton model trailer. The Automotive trailer is also made in semi-type from 2 to 15 tons capacity and in two-wheel type in 1- and 2-ton capacity. The Dayton steel wheel is used as standard equipment fitted with Firestone solid rubber pressed-on tires.

Wizard Valveless Tire Pump

WITH the advent of pneumatic tires as truck equipment, a new need was also created, that of providing a power driven tire pump, as standard equipment In order to fill this need, the Rex Machine Co., 3201 Shields Ave., Chicago, Ill., came forth with a new product, the Wizard Valveless Pump, which was shown for the first time at the Chicago Show. The engineering and mechanical principles involved in this design depart radically from the conventional pump. Only three parts compose the moving mechanism, namely, the piston, connecting rod pin and crank-shaft. No valves, springs, cams or wrist pins are used, this elimination of small parts does away with tremendous back pressure, which is difficult to conteract with the valve type pump when operating against high pressure. Another feature of this pump is that it will not cease to operate efficiently when run at high speeds. The crankshaft, as well as the connecting rod pin, are heat treated and hardened.



The Wizard Pump is of Two-Stage Compression Type

The lower cylinder forces air into the upper chamber where it is compressed to nearly one hundred pounds and forced direct to tire or tank

It is lubricated by heavy graphite grease supplied from a single grease cup.

This pump compresses the air in the following manner: The end of the crankshaft extending into the pump has an excenter fastened to it. This excenter also acts as a ball and socket joint into which fits the ball of the connecting rod pin. When the crankshaft rotates, the pistons are given an oscillating and reciprocating motion by the ball and socket joint. This oscillating movement of the pistons permits the intake and outlet ports to open and close at the proper time. When the lower piston is at the lowest point, the intake holes in the lower cylinder admit air into the crankcase, so that a preliminary compression is given to the air on the upstroke of the piston. At the same time a vacuum is created in the large cylinder into which air is admitted when the groove in the large piston registers with another intake port. This groove then connects with another groove which admits the compressed air in the crankcase chamber into the cylinder, thus giving an overcharge of air or preliminary compression. On the down stroke of the large piston, the air in the cylinder is compressed until the outlet groove on the piston registers with the outlet port, from where the compressed air travels by way of the by-pass or manifold into the upper cylinder.

Both pistons with connecting rod are of one piece and work opposed. When the large piston is discharging the small piston is taking in the charge, and on the up-stroke the compressed air in the small cylinder is compressed again to still higher pressure until a groove in this piston registers with an outlet port. At this moment a stream of air compressed to nearly 100 lb. will flow through the outlet port to a tire or tank.

Model C pumps are equipped with a coil of copper wire and the necessary fittings to attach to frame or to running board. Hose connecting with air pressure gauge is furnished extra. Brackets may be obtained for attaching pump to any standard truck transmission. The list price of this model is $51, including complete equipment. This pump will deliver air at the rate of 4800 cu. in. per min. at 500 r.p.m. The following table shows time required for various sized tires:

Sizes	Pressure	Time Required
38 x 7	100 lb.	4 min. 25 sec.
40 x 8	110 lb.	5 min. 30 sec.
42 x 9	120 lb.	7 min. 35 sec.
44 x 10	130 lb.	9 min. 25 sec.
48 x 12	140 lb.	13 min. 45 sec.

Martin Cushion Wheel

The Martin Cushion Wheel Co., 311 N. Sangamon St., Chicago, Ill., displayed at the Chicago Show a line of cushion wheels which are adapted for light as well as heavy trucks, ranging from 1½ to 7 tons in capacity. This wheel, known as the Martin Cushion Wheel, contains no bolts or nuts. It is pressed-on throughout and is light and strong. It is a simple, well-constructed unit and its rubber element consists of a rubber cushion containing 80 per cent. pure Para gum.

Constructional Details of the Martin Cushion Wheel

These wheels are built to S. A. E. dimensions for pressed-on type tires only. The sizes range from 32 x 3½ to 40 x 14, inclusive. Steel wheels of all types are furnished with the Martin Cushion element to fit any standard axle, at a small increase in price. The prices which are f.o.b. Chicago, range from $50 to $125 each for single tires 32 x 3½ to 36 x 7, inclusive, and $125 to $250 each for dual tires 34 x 3½ to 40 x 7, inclusive.

The Boyer Fire Apparatus

The Oberchain-Boyer Co., Logansport, Ind., featured at the Chicago Show an Oldsmobile Economy truck outfitted with the Boyer line of chemical apparatus. This outfit includes two 35-gal. tanks, 150 ft. of 13-16-in. cotton web rubber-lined chemical hose, a 24-ft. extension ladder, and one 12-ft. ladder; eight complete chemical charges, and other fire fighting apparatus, all of which go to make this outfit one of the most complete units that could be desired. This apparatus is guaranteed and all parts which might be found defective are replaced free of charge.

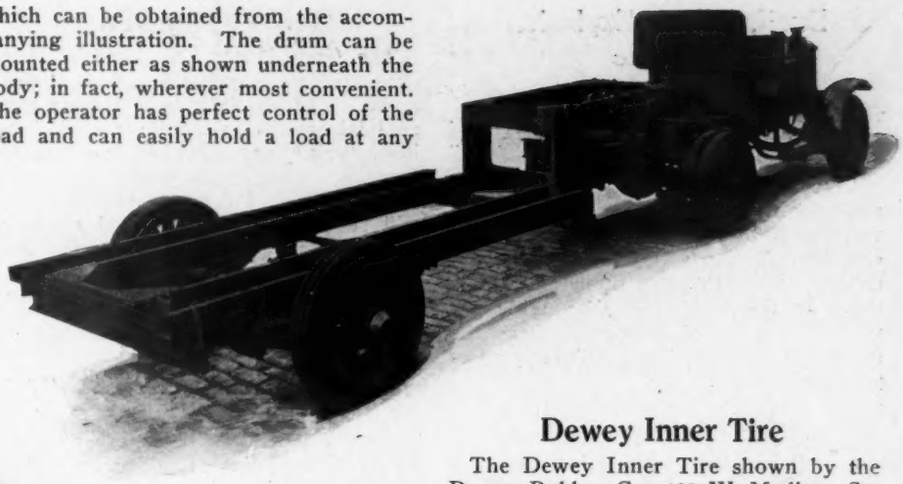
All-American Shown in Two Models

The All-American Truck Co., of Chicago, exhibited a 1 and a 2½-ton model, chassis only. The complete line includes a 1½-ton job. Among the features noted in this line is the massive frame in the 2½-ton job and the 6-in. frame in the 1½-ton job. Lubrication of the chassis is by Alemite Grease Gun. Detailed specifications will be found in another part of this issue.

New Warner Trailers

Besides showing its well-known line of four-wheel trailers, the Warner Mfg. Co., Beloit, Wis., exhibited a new drop frame trailer designed especially for hauling rice and sugar to and from the docks; and wherever bulky machinery such as contractor's equipment is to be hauled. This trailer is fitted with the Warner ball and socket fifth wheel.

Another interesting job shown was that of a Warner four-wheel trailer, upon which was mounted a specially designed body for hauling garbage. The body has a 5½ cu. yd. capacity and dumps from either side. A special feature of this body is that the bottom is absolutely water tight. The floor of this body is slightly depressed, as will be noted from the accompanying end view illustration, permitting about 3 to 5 in. of the lower part of the body to act as a liquid container.

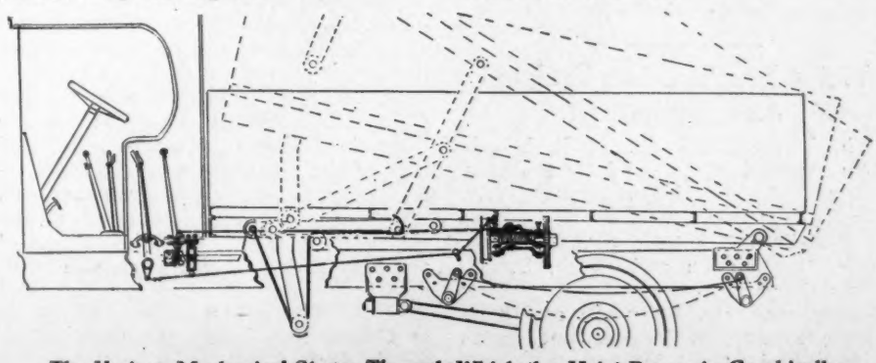


Warner Drop-Frame Trailer

Rear View of the Warner Garbage Trailer With Dump Body.

Giant Easy-Lift Hoist

Among the new things noted in hoist constructions at the Chicago Show was that shown by the Auto Truck Service Co., 946-48 Third St., Milwaukee, Wis., and of which T. C. Hollnagel is the proprietor. This hoist is mechanically operated, the power take-off being either directly from the propeller shaft or the gear box. Among the features of this hoist may be noted lightness of weight, saving of space between the driver's seat and the body, ease of installment, etc. The hoist really consists of a drum and cable arrangement, a general idea of which can be obtained from the accompanying illustration. The drum can be mounted either as shown underneath the body; in fact, wherever most convenient. The operator has perfect control of the load and can easily hold a load at any angle either when raising or lowering by the operation of two hand levers, one to engage the clutch and the brake lever to hold the load in position. When the load is raised the automatic cut-out disengages the driving clutches when the body has reached its given degrees.

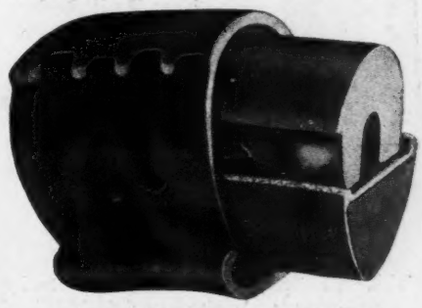


The Various Machanical Stages Through Which the Hoist Passes is Graphically Shown in This Illustration

Dewey Inner Tire

The Dewey Inner Tire shown by the Dewey Rubber Co., 123 W. Madison St., Chicago, is puncture-proof and cannot become rim cut.

The resilient element consists of a rubber cushion that has innumerable supporting protuberances that rest upon a springy V-shaped rubber shoe. This tire assembly is completely enclosed by a standard outer tire. This construction is claimed to make for easier riding and saving in gasoline. The tires are made in two models, namely, the Darco and the Velvet. The Darco Inner Tire is suitable for loads up to 2000 lb. and the Velvet for various other capacities.



Dewey Resilient Inner Tube

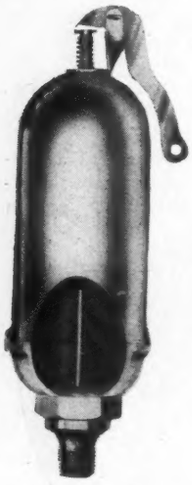
Dependable Red Seal Trucks

The Dependable Truck & Tractor Co., Galesburg, Ill., showed both its models, Model C, a 1½-ton job, and Model E, a 2½-ton job. The latter body was shown with the Columbia Steel & Machine Co.'s dump body and hand hoist. These models include Buda engines, Fuller transmissions, Wisconsin worm drive rear axles, Timken bearings, etc. Additional specifications can be found in the specification columns of this issue.

Buell, Junior, Explosion Whistle

An effective whistle, designed especially for the Ford, Maxwell and other small cars, is the product of the Buell Mfg. Co., Cottage Grove Ave. at 30th St., Chicago.

In this whistle are combined, fundamentally, the good features of the poppet valve with the special type Buell sound chamber. This whistle blows a clear and distinct note even when the engine is idling. As this whistle is thoroughly examined and tested before it leaves the factory, it is claimed not to develop compression leakage.



New Buell, Junior Explosion Whistle

This whistle works very satisfactorily in connection with the special Splitdorf spark plug supplied by this company. The use of the special spark plug is recommended in preference to the Adaptor, as the latter lifts the spark plug from its proper position in the cylinder. The price of the Buell, Junior, is $2.50, with Adaptor $3, and with spark plug, $2.75.

New Standard Model

Announcement is made of a new model Standard motor truck, known as Model 56, a job of 2½ tons capacity. This new truck was exhibited at the Chicago show by the Standard Motor Truck Co., Detroit, Mich. The same satisfactory principles of design that were incorporated in the older Standard models are employed in this new job. This new model is featured by the new Timken 2½-ton axle. Solid tires are listed as regular equipment, but pneumatics may be obtained if desired. The tire sizes are as follows: 36 x 4 in. in the front and 36 x 7 in. in the rear.

Victor Trucks Have Optional Axle Equipment

The Victor Truck Co., of St. Joseph, Mich., showed its 1½- and 2½-ton jobs, listing at $2050 and $2325, respectively. The Victor truck is built of standard units, including 3¾ x 5 Continental engine, Fuller transmission and clutch, Stromberg carburetor, Eisemann magneto, Ross steering gear, etc. The tire equipment includes 34 x 3½ in. Goodyear pneumatics in front and 34 x 5 in rear.

Gray Victory Motor

The Gray Motor Co., Detroit, Mich., exhibited the Gray Victory Motor, which is an overhead valve job, having force feed lubrication to the three main bearings, timing gears and connecting-rod troughs. Exceptional carburetion qualities are claimed for this engine, which will show high economy and efficiency with the present low grade fuel. This engine, although shown for the first time, was described in our June 1919 issue, page 79.

Goodyear Adds Dormitory

AKRON, O., Jan. 14.—The Goodyear Tire & Rubber Co. has made all plans for the construction of a dormitory which will accommodate about 190 girls. It will be a three-story brick building with limestone trimmings, and will be in charge of Clara E. Bingham, director of recreation.

There will be a large living room, four small reception rooms, a sewing room, and a laundry, as well as the usual sleeping rooms. It is hoped that this dormitory will take care of the out of town girls.

Williams Company Grows

AKRON, O., Jan. 28.—At a recent meeting of the Board of Directors of the Williams Foundry & Machinery Co., the development of the company within the last year was shown. There has been a steady and consistent growth and the treasurer's report for the preceding year showed that business had well surpassed the $2,000,000 mark.

Officers for the ensuing year were elected and include F. E. Holcomb, who was re-elected president and general manager; S. E. Ziliox, vice-president; G. C. Dietz, treasurer, and W. J. Slater, secretary and assistant treasurer.

The company manufactures Akron-Williams tire repair equipment and builds a large amount of machinery and appliances for the tire and rubber manufacturers.

Connersville Industries Combine

NEW YORK CITY, Jan. 6.—The United States Automotive Corp. was organized here recently. This new corporation has a capitalization of $10,000,000 of preferred stock and 200,000 shares of no-par-value common stock.

The companies included in the new corporation are the Lexington Motor Co., the Ansted Engineering Co., the Connersville Foundry Corp., of Connersville, and the Teetor-Hartley Motor Corp. The United States Automotive Corp. is a holding company only, and each of the subsidiary companies will retain its own identity and operate as usual.

Officers of the corporation are: Frank B. Ansted, president; George W. Ansted and Frederick I. Barrows, vice-presidents; James M. Heron, treasurer, and Roy A. Hanson, secretary. All reside at Connersville, where the main offices will be located.

What Do You Know About Drag Links?

CINCINNATI, O., Jan. 26.—The Cincinnati Ball Crank Co. has recently issued a short treatise bearing upon the average automobile and truck driver's knowledge of the insignificant but important drag link. This part is small in comparison to many other parts of a car, but it is vital, for upon it depends the steering control of the machine. For the benefit of those who are not familiar with the drag link, it is a small device that connects the steering gear with the knuckle thrust arm of the front wheel at the lower end of the steering gear. If the drag link does not function correctly the car or truck cannot be controlled.

When motor trucks and passenger cars were first manufactured the demand for drag links was so small that each manufacturer was able to make all those necessary for his own consumption. However, with quantity production the demand for drag links has become so great that their manufacture has grown into one of the important industries in the automotive field.

The Cincinnati Ball Crank Co. was one of the pioneers in the field, and when its president, Clifford Green, formed the company for the manufacture of machine tool handles in 1906 only twelve or fifteen men were included on his payroll. Now it is claimed that the company turns out more machine tool handles and drag links than all the other manufacturers of similar tools combined.

Gary Has Not Changed Ownership

GARY, IND.—The Gary Motor Truck Co., of this place, announces that various reports to the effect that it has changed hands are absolutely incorrect. This erroneous rumor is based on the fact that some Kansas City friends of the company were so well pleased with its increased production schedule that they bought out some local stock owners and got control of the stock. The business has not changed hands and will be run on the same plans as formerly.

General Motors Acceptance Corp., New York City, which offers financial service to dealers and users of General Motors products, announces that it is now buying notes at the rate of $80,000,000 per year. It has recently established new branches in Los Angeles, Cal., and Dallas, Texas. Other branches, besides the main one in New York City, are located in Chicago, Detroit, San Francisco and Toronto, Canada. A branch is soon to be opened in Atlanta, Ga.

Chadick, DeLamater Corp., No. 159 W. 24th St., New York City, now represents the following firms in addition to those whose products they already handle: Pierce Governor Co., Anderson, Ind.; Automotive Parts Co., Indianapolis, Ind; Apollo Magneto Corp., Kingston, N. Y.

The Advance of Automotive Industry in 1919 and the Outlook for 1920

Extracts of Annual Report of President Charles E. Thompson of the Motor and Accessory Manufacturers' Association

IN an industry growing as rapidly as ours, it is natural that each passing year should seem the greatest. The automobile, which but yesterday was a dream, a plaything, bravely withstanding the scoffs and jeers of an unbelieving world, is today the monarch of a universal industry, world-wide in its dominion, almost irresistible in its ramifications, and infinite in its possibilities.

The part which our branch of the industry has played in this romance of science and business is no small one. In fact, it has always been, and it is today, a major, if not a stellar role. This was unusually well demonstrated by the events of the year just closed. * * *

The parts and accessory manufacturer is the big brother of the car builder. If the majority of motor vehicle manufacturers had been manufacturing their own integral units during the war, instead of buying them from highly specialized motor and accessory manufacturers, the enormous production records now being made would be impossible.

This phase of the subject has been summarized so ably by one of the members of our Board, Mr. G. W. Yeoman, treasurer of Continental Motors Corp., Detroit, that I am taking the liberty of quoting some of his salient conclusions, as contributed to the association's recent symposium:

"The year 1919 has done much to prove to the automobile and truck assemblers the value and importance of having as their sources of supply, reliable and progressive unit makers. On every hand it was demonstrated that to increase car production was a simple matter, but that to increase the production of units was a task heretofore not appreciated. Unit manufacturers were compelled to purchase additional machinery and to expand their plants, while they were at the same time finishing up war contracts. Remarkable strides have been made by the motor and accessory manufacturers in helping the car and truck manufacturers to get back into business.

"Severe losses would have been sustained by many car and truck producers were it not for the balancing effect that the motor and accessory manufacturers were able to give them in the way of changing schedules, both increasing and decreasing, according to rapidly changing conditions."

A Year's Progress and Results

So much for general conditions affecting the parts and accessories industry. The association, as such, has had a big year, a vital year, a year of constructive progress, a year of growth in every way.

Of paramount importance is the change in the financing of your association. With the features of this plan you are of course familiar. Briefly, it became manifestly necessary last year to assure a sound financial basis for the work of the association. The old dues of $50 per year, fixed at the time of the founding of the organization in 1904, proved hopelessly inadequate. On this basis our revenue from dues amounted to about $17,000 a year. To keep up these activities, we were forced to depend upon the income from the automobile shows. The experience of the last two years showed that this income was too uncertain for an organization of our size and scope. The amount varied, and at best it was an unknown quantity. Furthermore, it gave us only a hand-to-mouth financial existence, unless we wanted to make encroachments on our capital fund. We found last year that the cost of running the association was something like $75,000 a year, with an assured income of only $17,000.

Your directors and the management of the association gave careful consideration to the problem in all its phases and finally adopted the new basis of dues, which went into effect on the first of January, 1920. This divides the membership into five classes, according to their annual gross sales to the automotive industry, the dues being arranged on a sliding scale, ranging from $100 to $500 a year, and the initation fee of $100 remaining unchanged.

Refinancing Plan a Success

I am gratified to report to the membership at this time that the re-financing plan is an assured success. * * * Owing to the fact that the returns are still coming in and cannot be finally tabulated until next month, it is impossible to give you exact figures, but close to 300 members have already approved the plan. Our membership at present is three hundred and sixty-nine.

A very small percentage will drop their membership in the Association, but this is to be expected, as many companies are constantly changing the character of their business.

The average dues, on the basis of the new classification, will be approximately $300 per year. Our income from dues next year, therefore, should be about $70,000 or $80,000, if not more. This places the association on a secure financial foundation.

Membership Drive in 1920

When we consider that the association was founded on March 2, 1904, with 37 charter members, this record of consistent and sturdy growth is indeed noteworthy. In 1916, we had two hundred and forty-one members; in 1917, two hundred and sixty-three; and in 1918, three hundred and eleven.

In this connection, I think it is pertinent to say a few words about the proposed membership campaign which the general manager, Mr. Heminway, expects to launch next month. Other things being equal, the larger our membership, the stronger will be our position, and the wider our influence. It is therefore manifestly advantageous to have all eligible manufacturers of automotive parts and accessories affiliate themselves with the association. * * *

It has been suggested, and I think the plan is a sound one, that each member make himself personally and directly responsible for obtaining one new member. * * * The details of the membership campaign will be announced in due time, but meantime I urge all the members to send in to Mr. Heminway names of all prospective members, and suggestions as to the best methods of getting them into the fold.

Credit Work Expanded

The work of the Credit Department will be covered in detail by the report of the Finance Committee. I should like to invite your attention to the remarkable development of our credit work along broad lines. The last annual convention, which was held in Buffalo, marked an important milestone in the onward march of the association. The creation of the Credit Service Committee to function with your General Counsel in cases involving bankruptcy or other financial embarrassment, is a forward step, the far-reaching significance of which it would be hard to overestimate, not only from the viewpoint of your association, but from the viewpoint of the industry generally. * * *

The full report of the Credit Convention at Buffalo has been printed in a special issue of the association magazine, The Digest. This seems to me to be so important that I urge all members who have not yet done so to study this report with great care.

Organization of Credit Service Committee

The organization of non-competitive groups for the dissemination of credit information is another significant development which is discussed in the report of the Finance Committee. No efforts are being spared to make the Credit Department Service of your association the most accurate, the most complete, and the most helpful in the industry. The routine work and the special activities are both being developed and being perfected at all times.

Work on Excise Tax

We were all affected by the War Revenue Act, and we are still vitally concerned in the Excise Tax on automobile parts and accessories. Your association has acted as the spokesman for its branch of the automotive industry in the all-important work of adjusting the administrative

provisions of the law to the practices of the industry, and in the essential task of clearing up confusing points in the law and in the regulations. * * * Through the bulletins issued from time to time, the members have been kept advised of new decisions, interpretations, and other matters of importance.

New Departmental Services

The day-by-day and week-by-week services of the association have been considerably extended. You are now receiving regularly from the general offices of the association the following classes of reports and bulletins:

Red-tip or special bulletins—(Pink).

General Bulletins—(On Miscellaneous Matters)—(Buff).

Credit Bulletins, Grading and Reports—(White and Yellow).

Traffic Department Bulletins—(Green).

Export Bulletins—(Blue).

Press Release Bulletins—(For Publicity and House Organ Use)—(Gray).

In addition, it is planned to add very shortly the following bulletin services:

Legislative Bulletin Service.

Advertising Bulletin Service.

The names of these various classes of service clearly indicate the nature of their contents and their usefulness. Coming as they do in concrete, compact form, with a separate color for each class of bulletin, they can be handled quickly and efficiently at the various companies, each executive receiving those bulletins and reports concerning his department.

Your association magazine, The Digest, under the editorship of the assistant to the general manager, has been enlarged and modified to become a publication of real interest and importance. Another important editorial activity is the publication of a Year Book, which was issued for the first time during 1919.

The appointment of a field secretary for the association is another noteworthy step forward. Mr. Alexander W. Barber, formerly connected with the Irving National Bank of New York, who is now engaged in this work of keeping in direct personal touch with the members. * * * Through the work of the field secretary, the association will be in position to be of considerably greater helpfulness to the members, both individually and collectively.

Plans are now being worked out for the creation of a Foreign Trade Department within the association. A start has already been made in the inauguration of our export bulletin service, which has met with most favorable response from the membership.

The challenge of the world markets is one that we cannot evade. It is a challenge which we can meet best by presenting a united front, and by adopting, as an industry, a broad-gauge, far-seeing, consistent policy. It is on this principle that we are working in mapping out a plan of action.

Progress has been made in the last year in the legislative work of the association. This consists in watching the legislation of the various states, and of Congress, and keeping the members advised of all bills affecting their particular interests, or the entire industry.

Team Work With Other Associations

With the Society of Automotive Engineers, the National Automobile Chamber of Commerce, The Rubber Association, and the various dealers, jobbers, trailer, truck and tractor manufacturers' groups and associations, your association is in constant and cordial communication. Where work can be done best jointly, it is handled in that way.

Your association is also contributing to the support of the Highways Industries Association in the promotion of good roads. * * *

Turning now to the future, we are facing a year which it is conservative to say will be the greatest so far in the history of the automotive industry. The old problems will be with us, bigger than ever, more than complex, more insistent in their challenge. In addition, there will be new twists and new phases of the old problems, and an entirely new set of 1920 problems. We must not let them catch us unawares.

American Standards of Quality

As long as we are faithful to our American standards of quality, service, and specialization, the automobile industry will continue to grow in public confidence, and the consumer, after all, is the ultimate arbiter of our destiny.

No matter how great the temptation of enormous demand, we must remain steadfast in our insistence on quality and standardization. The parts makers, the unit manufacturers, the makers of accessories, have all proved themselves ready to meet the crucial challenge of peace as well as war.

These are the days that are testing and trying our most fundamental institutions, in business, in social life, in politics. Never was it more acutely imperative to think together, to work together, to move forward together. We cannot run the automotive industry in a one-horse way; it must be run the way an automobile is run: by the single-minded team-work of all the parts and units. Our greatest object-lesson is our own product.

New York State Road Construction Plans for 1920

ALBANY, N. Y., Feb. 5.—The program of proposed construction and maintenance of roads in this state for 1920 is just announced by the Commission of Highways. The list is revised to Dec. 31, 1919, and in publishing the same the Commission introduced a new policy which it intends to make a permanent rule of the department. It is believed that the early anouncement of the construction program will afford contractors ample opportunity to look over the roads, to locate sources of supply of local materials, investigate terminal facilities and investigate transportation conditions as well as arrange for motor truck service. By this plan contractors will be able to assemble plant and material on the work and make other preliminary arrangements in advance of actual operations.

To Construct 772 Miles New Roads

New York plans to construct 772.97 miles of new roads in 1920, at least; that is the tentative program which may be slightly modified. The list of work includes Federal Aid, State and County highways and, with the exception of one or two counties, all will be benefited with new construction. The construction plan will give a total of something like 8,300 miles of completed highways.

Approximately 75 per cent. of the new roads will be concrete construction. Eight counties are to have 25 miles or more of new roads.

Reconstruction and Resurfacing

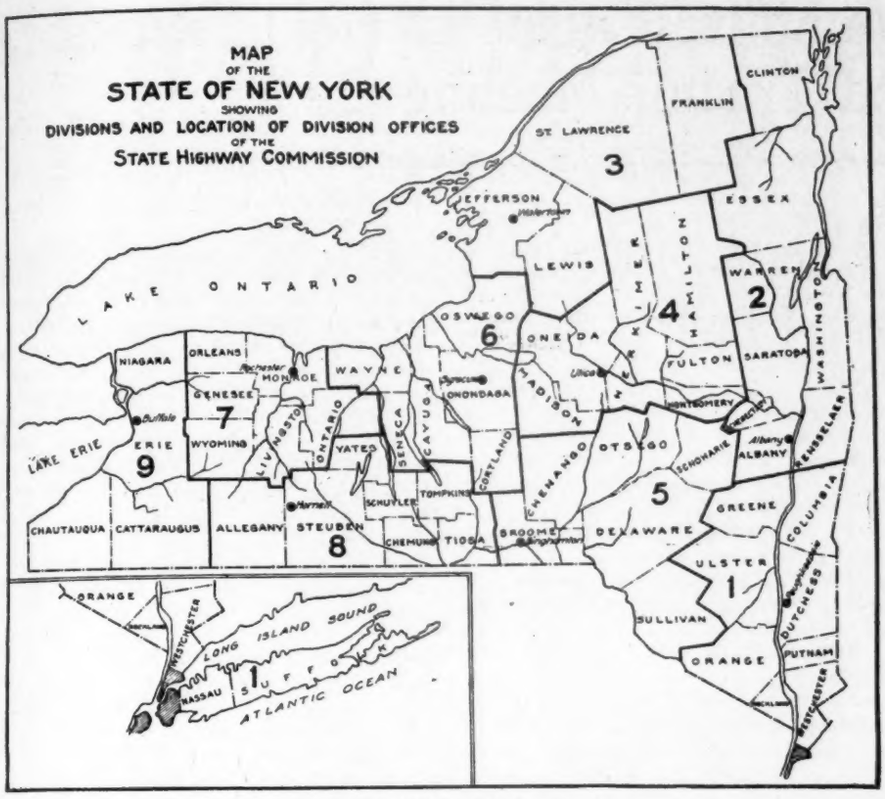
The tentative program of highways to be reconstructed and resurfaced during 1920 in the various counties calls for about 358 miles of reconstruction and 1095 miles of surface treatment provided sufficient funds are appropriated by the legislature. An appended table gives the mileages of new roads, etc., of the various counties.

While the State maintains a large fleet of trucks including those awarded by the Government the part of the work will be awarded on a contract basis. Active work will begin about May 1, weather conditions permitting. According to an official of the Commission of Highways the 3½-ton truck with dump body is the predominating type; in fact, the State is standardizing on one make of that capacity with a hydraulic hoist dump body. The body is also being standardized, it being a combination wood and sheet-metal of three cu. yds. capacity. It is stated that the majority of contractors favor the 3½-ton truck.

The State is divided into nine divisions each in charge of an engineering department and the State trucks, of which there are at present about 150 in service, are divided among the divisions. The program for State work during the coming year calls for 650 miles of oiling.

Ample Time Afforded for Inspection

The early announcement of the program of proposed construction and maintenance of New York's highways affords the truck dealer an excellent opportunity to merchandise trucks among the contractors. Inasmuch as the highways listed will be advertised during the first four months of the year the live dealer should be able to obtain some good leads, and the early announcement of the State's program should afford the dealer ample time to compile a list of contractors in his respective territory as well as to secure the name of the successful bidder on the contract. To those dealers not familiar with road constructing work there is ample time for them to study



New York State Map, Showing Counties

The accompanying table shows amount of road work to be done in each county

County	New Roads Miles	Reconstruction, Miles	Surface Treatment Miles
Albany	17.29	10.96	8.53
Allegheny	12.85	....	23.59
Broome	23.28	10.67	43.68
Cattaraugus	26 54	10.30	6.40
Cayuga	8.30	.88	13.27
Chautauqua	28.84	....	1.04
Chemung	4.55	2.68	26.99
Chenango	9.92	8.12	41.72
Clinton	18.20	8.19	19.39
Columbia	11.62	6.12	8.87
Cortland	9.04	9.49	29.54
Delaware	32.10	2.34	9.84
Dutchess	7.23	8.20	7.64
Erie	23.77	11.23	22.43
Essex	6.00	6.06	....
Franklin	10.66	5.80	19.94
Fulton	1.10	5.12	10.43
Genesee	6.30	1.00	23.24
Greene	6 06	5.03	11.31
Hamilton	3.00	....	11.46
Herkimer	10.46	3.74	16.13
Jefferson	15.76	11.50	30.00
Lewis	4.74	6.50	31.13
Livingston	10.34	10.77	19.99
Madison	6 85	5.86	22.70
Monroe	7.69	11.30	48.11
Montgomery	8.13	7.21	22.87
Nassau	16.05	2.50	14.47
Niagara	2.38	1.25	....
Oneida	19.60	11.41	62.14
Onondaga	6.77	13.70	17.58
Ontario	7.55	9.34	33.21
Orange	24 99	12.61	29.98
Orleans	6.92	5.70	29.06
Oswego	29.97	10.00	23.30
Otsego	9.55	2.92	47.64
Putnam	....	1.28	6.05
Rensselaer	9.90	3.53	14.84
Rockland	12.49	5.88	2.20
St. Lawrence	39.30	16.50	21.25
Saratoga	24.27	10.33	....
Schenectady	7.32	4.55	....
Schoharie	24.32	....	16.34
Schuyler	7.60	1.48	17.21
Seneca	13.50	4.29	9.08
Steuben	23.97	5.00	69.51
Suffolk	5.69	6.18	6.87
Sullivan	....	4.37	8.88
Tioga	18.85	6.00	30.34
Tompkins	5.10	3.31	22.44
Ulster	36 58	10.31	12.62
Warren	9.98	4.50	....
Washington	20.18	6.04	16.63
Wayne	16.30	3.02	12.16
Westchester	16.80	10.35	18.22
Wyoming	11.28	6.18	9.99
Yates	16.49	4.25	13.14

its details insofar as transportation is concerned, and to obtain data as to the body requirements, hoists, etc.

The Sales Angle

The completion of the road building trucks. Contractors will augment their program will require a large number of fleets and in many instances will hire a large number of additional trucks. This should enable a progressive dealer to interest prospects in purchasing trucks and afford an opportunity to sell dump bodies and hoists to that class of truck owners who do rental work. The average dealer sells trucks on the preferred payment plan and very frequently is obliged to co-operate with the purchaser in obtaining work on contracts. The road construction work for 1920 in the State of New York, and other states as well, will enable the dealer to aid that type of truck owner that is not successful in keeping the truck operating.

Should Know Costs

In order that a dealer be able to advise something about the operating costs of trucks in road construction. He should know the average number of miles traveled by the truck per day, the loads carried, etc., and above all consideration should be given to the type of road traveled; that is, from the source of supply of the road material to the work. It may be found that under some conditions the wear and tear on the truck will be greater than under normal conditions, of operating over good roads. Then again the location of the work may be some distance away from the headquarters of the owner compelling the driver to be away from home for a long period. This will require careful figuring on the part of the dealer co-operating with his client. And if the truck is rented on a day basis it will be well to consider the number of trips or given number of yards to be hauled for it is possible for the contractor to attempt to obtain full value for his money. By this is not meant that the truck driver should not fulfill his employer's contract or agreement.

Overloading Feature

The dealer selling a truck to one engaging in rental road work will do well to caution him to instruct the driver not to permit overloading. In loading the truck engaged in hauling road material it is an easy matter for the contractor's laborers to throw in a few extra hundred lbs. of material, to load to the heaping point. If the dealer will study a table of weights of road materials or weigh loads of road-building material he will see the point in question. Overloading under normal conditions is bad enough but in road construction work it is an evil for in many instances the type of roads over which the truck travels, severely rack the chassis.

Gary Motor Trucks

The Gary Motor Truck Co., Gary, Ind., had practically its entire line on display, the line consisting of a 1, 1½, 2½, 3½ and 5-ton sizes. Outside of a few minor details, no radical changes have been made in these models, all of which are standardized jobs utilizing high class units throughout.

Brunner Service Improved

UTICA, N. Y., Jan. 22.—A new service station has been opened in Kansas City by the Brunner Mfg. Co. The demand for the type of garage equipment carried by the company has grown so great that it has become necessary to carry stock at different central points in order to facilitate the delivery to the trade. The Kansas City office, which is in charge of H. S. Atherton as district manager, will take care of the trade in the central territory west of the Mississippi River. The Cincinnati branch has been enlarged to take care of the increased business in the central, north-central and south-central states.

Gawthrop & Wister Co., distributors of Clydesdale trucks in Philadelphia, are now located at 14 S. 21st St., where they have ample facilities and equipment for giving the best of service. J. A. Wister, vice-president and general manager of the company, is an ex-president of the Automobile Association of Philadelphia.

Besides the salesrooms, which provide for the complete display of all Clydesdale models, the four-story building with its 70 ft. frontage and its 108 ft. depth, offers ample room for a complete parts department with parts in stock for every Clydesdale truck and a capable service department, equipped with the latest machinery for taking care of repair jobs.

Society of Automotive Engineers Hold Truck and Tractor Meeting

THE use of aluminum for decreasing unsprung weight of trucks, tires and the saving of fuel by using leaner mixtures were the subjects discussed by the truck engineers at the Chicago Truck and Tractor Meeting of the Society of Automotive Engineers held at the LaSalle Hotel, Jan. 18. They are subjects in which the truck dealer is interested in a practical way, and they are subjects on which the truck engineers are working in the betterment of truck transportation.

"The use of aluminum for wheels and some other parts in the reduction of the unsprung weight of the truck," said A. H. Edgerton, who presented a paper on Decreasing Unsprung Weight by the Use of Aluminum, "means improved riding qualities, economy in tire wear and better acceleration. As we increase the speed of an empty truck, the road adherence becomes unfavorable and the shocks and vibrations of such empty trucks cause rapid deterioration. These shocks and vibrations frequently are responsible for the loss of time for examination and repairs to the parts. Where trucks are employed in rural transportation work, and where heavy loads at high speeds are required, there is no better way to prevent rapid deterioration of the engine than to safeguard it by attaining better riding qualities.

Considerable effort has been expended," continued Mr. Edgerton, "in an endeavor to better the 'get-away' of cars, though it appears that little attention has been given to one of the salient factors, that of reducing the weight of the wheels and axles. By decreasing such weight we reduce proportionately the inertia that must be overcome in accelerating. In all the larger cities traffic in certain districts is so congested that a driver has to make innumerable stops, sometimes several in a single block. It is believed that in considering the acceleration of a vehicle, the point of most general interest centers in that phase of the problem which deals with the momentum of the truck when starting from rest."

"Relation of Solid and Pneumatic Tires to Motor Truck Efficiency," was the subject of a paper by S. V. Norton, and the "Design of Pneumatic Tired Trucks," was taken up by C. M. McCreery.

The latter pointed out that there are two fundamental advantages which result from the use of pneumatic truck tires—increased cushioning, and increased traction. Faster transportation, economy of operation, less depreciation of fragile load, easier riding, less depreciation of roads, and lighter weight trucks, are the results obtained by increased cushioning. The upkeep or repair cost of a truck operated on pneumatic is much less than when operated on solid tires, and this can be attributed to the decreased amount of vibration and the absence of severe shocks and jolts, and the estimated saving in upkeep and repair costs is from 25 to 50 per cent. Mr. McCreery said that pneumatic tired trucks are depreciated on a basis of 80,000 miles, but that he believed this too low as there have been trucks which were pneumatic equipped that at the end of 250,000 miles were still in running condition. He predicted that in the near future trucks will be depreciated on a basis of 100,000 miles.

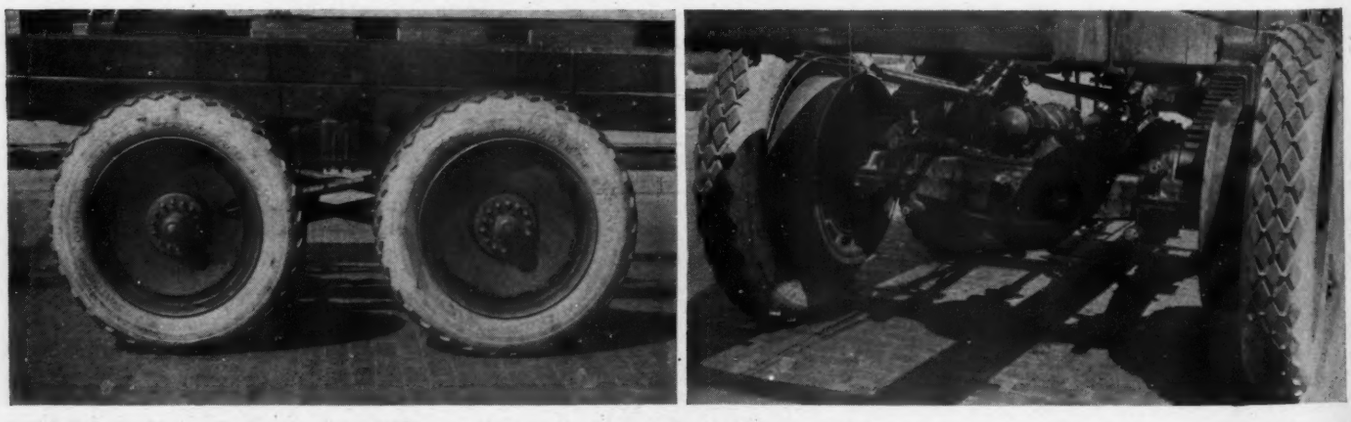
The depreciation of fragile loads is considered by many users to be one of the most important advantages. In the hauling of such fragile materials as bottled milk and eggs, there is very little, if any, breakage, and the farmer experiences very little depreciation in the live stock and produce which he hauls to markets.

Mr. McCreery described a new six-wheel truck, two of which his company has under construction at the present time. These trucks were described in our December, 1919 issue, page 123.

Some of the advantages the six-wheel truck has over the regular four-wheel type of the same capacity, on 41 x 12-in. pneumatic tires are: Saving in cost, reduction in weight, reduction in axle cost, increased traction, better riding qualities, less damage to roads, larger brakes and greater operating service.

In giving the result of their experiments, C. A. Norman and B. Stockfleth, found that the use of a lean gasoline mixture would not only give better results than using kerosene, but give better satisfaction all around. If all the trucks and tractors used the latter fuel, tendency would be to increase the price of kerosene.

The meeting was concluded by a dinner at which Major-General Leonard A. Wood was one of the speakers. General Wood pointed out the necessity of continuing the work of the Motor Transport Corps and truck transportation, which can only be brought about through the building of more improved highways. "There should be a complete network of improved roads throughout the country," he said, "and complete systems from one end of the country to the other, particularly along our borders."



Views of the Goodyear Six-Wheeled Pneumatic Tired Truck

The upper view shows one of these trucks, weighing 10,700 lb., carrying a load of building material weighing 17,200 lb., making a total of 27,900 lb. The unusual weight of this load is of particular interest as it is carried on 7-in. pneumatic tires, a feat quite impossible on a four-wheeled vehicle. The lower views are close-ups of the rear wheel assembly, showing how the wheels are attached to the springs and the method employed in incorporating two worm driven rear axles.

NEW COMMERCIAL CARS

Stoughton Wagon Company Now Producing Trucks

The Line Consists of Three Worm-Drive Models of One and a Half Ton, Two-Ton and Three-Ton Capacities

THE Stoughton Wagon Co., Stoughton, Wis., is one of the oldest freight and farm implement manufacturers in the country, dating back to 1863. It has a capital and surplus of over a million dollars. With this substantial standing and its present equipment which includes its own foundry and general machine shops, nothing but success is predicted for this recent entrant of the motor truck field.

New Stoughton Equipped With All-Weather Cab and Farm Body

The officers of the company are the following: F. J. Vey, president; Henry Beattie, vice-president; M. J. Vea, treasurer, and W. C. Hegelmeyer, secretary. The engineers are graduates from the University of Wisconsin, one being a mechanical and the other an electrical engineer.

The method of assembling the Stoughton truck is along the familiar progressive principle in which one unit is assembled after the other, according to a predetermined schedule. The factory equipment is complete and consists of the most modern types.

The most prominent characteristic of the Stoughton line is the oversize construction. This is especially marked in the 1½-ton job. Other individual features in the 1½-ton job are the following:

A four universal joint propeller shaft; impulse starter equipment; a special mounting of the radiator, which incorporates unusual size spring bolts lubricated by Brown-Lipe oilers; radius roads; slotted rear brackets.

As all of these three trucks are built along the same general lines, the description of Model B 1½-ton truck, will in a general way apply to the 2- and 3-ton jobs. The engine is in unit with the transmission and clutch and rides on a three-point suspension. Special slotted rear engine brackets allow for the weaving of the frame when traveling over uneven roads.

The engine is a Waukesha Model B U X 4-cylinder with a 3¾ in. and 5¼ in. bore and stroke, respectively. The cylinder head is removable. It is equipped with a centrifugal governor of own manufacture and controls the speed to 18 m.p.h. or 1200 r.p.m. The Brown-Lipe selective sliding gear transmission is in unit with a multiple-disk clutch of own design and is inclosed in the bell housing. The transmission provides three speeds forward and one reverse. An unusually low gear ratio of 4.6 to 1 is obtained in first; on second 1.68 to 1 and on third 1 to 1, reverse 4.35 to 1. Power is transmitted through a propeller using four Hardy thermoid universal joints which are supported amidships by a double Timken roller bearing, to a worm-driven Sheldon rear axle. The worm, worm wheel and differential are mounted on high grade annular ball bearings. The front axle is also of Sheldon design.

A Model M Stromberg carburetor fed by gravity from a 20-gal. tank located under the driver's seat and which is adjustable to high and low speeds is used. Provisions have also been taken for a hot air intake from the side of the exhaust manifold. Ignition is furnished by an Eiseman high-tension waterproof adjustable spark magneto, equipped with an impulse starter. The cooling water is circulated through the water jackets and radiator by a centrifugal pump. The connection between the radiator and engine is by a flexible hose. Cooling is further assisted by an 18-in. fan which runs on ball bearings and is driven by a wide flat belt. The radiator is of the fin and tube type and of Stoughton design. In addition to the usual coil spring under the bolt head, the radiator is directly mounted on two cantilever springs fastened to the top of the frame, which is claimed to entirely eliminate the effect of road shock and side strain.

Several striking features are found in the spring shackle and hangers. The wearing surfaces are all bronze-bushed.

The bolts are of unusual size and lubricated by Brown-Lipe oilers. The extraordinary size of the spring bolts was de-

Radius Rod Construction is Employed in the Stoughton Line. This Picture Shows a Special Pneumatic Equipped Job

cided upon as a result of the experience of American trucks in France. The springs are semi-elliptic, special heat-treated, having eleven leaves, 2½ x 50 in. in the rear, and 8 leaves, 2¼ x 40 in. in the front. Radius rods were decided upon so that the average truck thrusts would not be entirely imposed upon the springs. They are fastened to the rear axle with a cast-steel plate and to the frame in a bronze-bushed socket which tends to eliminate vertical strains and strains of rotation. The frame is of 5½-in. pressed steel channel, 210 in. long. The wheelbase is 140½ in. long. The service, foot operated, double acting internal expanding brakes are 3½ in. wide, and the emergency, double acting internal expanding brakes are 2¼ in. wide. Both operate on 18-in. brake drums. A special feature of the brakes is the method of equalizing the pressure on the brake drums of both wheels.

The steering gear is of the semi-irreversible type, adjustable and accessible, and is placed on the left-hand side.

Standard S. A. E. artillery wheels of seasoned hickory are equipped with Goodyear tires 36 x 3½ in. front and 36 x 5 in the rear. Pneumatic equipment is optional.

The equipment includes: Driver's seat, two oil dash side lamps and tail lamp; set of tools in kit roll; 2-ton jack, special wrenches and tools; warning signal mounted under the floor and mud guards for front wheel connected solidly with running boards.

The wheels and tires are 36 x 4 and 36 x 7 on the 2-ton, and 36 x 4 and 36 x 8 on the 3-ton. Pneumatic equipment being optional.

Betz Temporarily Specializing on Two and a Half Ton Model

Standard units, such as Buda engine, Timken axle, Brown-Lipe transmission and clutch, oversize pressed steel reinforced frame and steel wheels are incorporated in the 2½-ton Betz truck. The Betz Motor Truck Company, Hammond, Ind., is at this time specializing on this particular model and have contracts that demand its gross output up until April 1st. Incidentally, it may also be mentioned that the company is at present time moving into a new factory, which provides 28,000 sq. ft. of floor space. This increase in the plan gives the Betz organization unusual housing facilities.

Two and a Half Ton Betz Job With Cab, Sells for $2785, f. o. b. Hammond, Indiana

The specifications of the Betz 2½-ton truck are as follows:

Engine—Buda Model HU, latest military truck type. Bore, 4¼ in.; stroke, 5½ in.; capable developing 43 hp. and is supported at three points.

Governor—Pierce shaft driven, entirely automatic in operation.

Carburetor—Stromberg with hot air intake.

Ignition—Bosch high-tension magneto.

Cooling—Centrifugal water pump.

Radiator—Tubular armored built-up type, protected by guards.

Lubrication—Force feed oiling system.

Clutch—Brown-Lipe 13 plate Raybestos lined.

Control—Left side drive, center control. Spark and throttle control on dash.

Rear Axle—Timken Detroit full floating worm drive. One-piece pressed steel housing.

Steering Gear — Ross irreversible. Worm and nut type. 20-in. wheel.

Transmission — Brown-Lipe 4-speed forward. Extra large gears supported by 5 Timken taper roller bearings.

Springs—Extra heavy high test steel; has locking device to prevent slippage on axle.

Front Axle—Timken I-Beam section, drop-forged in one piece and heat-treated. Six Timken taper roller bearings used.

Frame—Hydraulic pressed steel slightly exceeding 6 in in depth by 220 in. long. Braced with 5 center members.

Brakes — Duplex internal expanding. 18 x 3½ in. surface.

Wheels—Dayton all steel.

Tires—Regularly equipped with Firestone. Front, 36 x 4; rear, 36 x 7. Optional equipment of any standard make without charge.

Wheelbase—Standard 150 in., although 160 in. may be obtained as extra.

Weight—4870 lb. Body allowance, 1200 lb.

Cab—Well constructed and heavily reinforced throughout. It is equipped with heavy storm curtains for winter.

Equipment—All weather cab, gas lights, gas tank, front fenders, jack, tools and explosion whistle. Price, $2785.

Bodies of any description and style are also made by this company.

Reynolds Truck to be Produced in Five Models

The Reynolds Motor Truck Company of Mt. Clemens, Michigan, while a new comer in the industry, was promoted and is managed entirely by men who are pioneers in the motor industry and date their connection back as far as 1902. The machines are designed throughout by the engineering department and represent, according to the manufacturers, a highly improved type of the celebrated "Class B" heavy duty truck of the United States Army.

Each model is identical except in the matter of proportion and are built in the following capacities—1½, 2½, 3½ and 5 tons. Every moving part throughout the chassis is fitted with graphite-bronze bushings and these in turn with a new type of oil cup requiring attention only once in every thousand miles. The engines are all four cylinder with direct pump pressure lubrication to each and every wearing surface. The clutch is a dry plate; transmission, four speed, mounted amidship in the frame on three points, worm and worm wheel rear axle.

Frames are of heat treated channel section fitted with regulation pig tail towing hooks at the four corners and a spring draw bar or trailer connection at the rear. "Smith" cast metal wheels are standard on all models, as is likewise cab, windshield and curtains, self starter, generator, battery, electric lights, heavy radiator guard, front bumper, hub odometer, motor meter, and an unusual tool equipment.

In March the company plans production of a specially designed intercity express truck, mounted exclusively on pneumatic tires, with a carrying capacity of four tons and a speed of thirty miles per hour.

Doehler Re-elects Officers

BROOKLYN, N. Y., Jan. 10.—The Doehler Die Casting Co. re-elected the following named officers at its annual meeting: H. H. Doehler, president; H. B. Griffin, vice-president; O. A. Schroeder, treasurer, and O. A. Lewis, assistant secretary. J. Krauland was chosen as second vice-president in charge of production and Charles Pack as secretary and chief chemist.

Luedinghaus Wagon Company is in Production With a New Two-Ton Truck

REALIZING the increasing importance of the truck as a dominant factor in the present day system of freight transportation, the Luedinghaus-Espenschied Wagon Co., St. Louis Mo., wagon manufacturers for over fifty years, recently started in production with a truck of two tons capacity. Nothing but success is predicted for this job as the new field in which this company is now entering is but an enlargement of the line of work it has been engaged in for a number of years. This truck, known as the Leudinghaus Model A, was designed with an eye on the requirements of the average farmer, manufacturer and numerous other concerns having use for a truck of this capacity. The design of this truck embodies many refinements in detail, the radius rod construction is used as it was decided that it will more effectively take the driving torque, leaving the springs to perform their own particular function.

The Luedinghaus Model A, a New Product From St. Louis

The engine is a Waukesha Model RU 4R in unit with a multiple-disk dry-plate clutch and three speed transmission. The engine has a bore and stroke of 4½ x 5¾ in., respectively. It is capable of developing a maximum hp. at 1100 r.p.m. One of the distinct features is a patented governor of own make, which is built into the engine, self-lubricated and adjustable to any speed. The transmission is also manufactured by this company and is of the selective type with three speeds forward and one reverse. The gears are all chrome nickle steel and are mounted on annular ball bearings. The gear ratios are: High 1-1; second 1.87-1; low 3.8-1, and reverse 2.88-1. The final drive is through a worm-and-gear axle with a ratio of 8.2-3 to 1. The drive shaft of this semi-floating axle is 2⅜ in. in diam. and is made of vanadium alloy steel. This rear axle assembly incorporates nine separate ball bearings.

Power is transmitted from the engine to the rear axle by a two-piece propeller shaft provided with three universal joints. Alignment of the shaft is maintained by a ball bearing support in the center. This support is claimed to eliminate any tendency toward shaft whipping.

Carburetion is by a 1¼ in. Shebler of the Government type and control of the air valve for starting is mounted on the dash convenient to driver. Ignition is provided by a Splitdorf high tension magneto. Starting is made easy on the magneto by the use of an impulse starter, which is automatically released when the engine speed reaches 100 r.p.m. The spark is controlled by a lever on steering geer.

The cooling fluid is circulated by a large centrifugal pump. The radiator is of the honeycomb type, the core being of the copper tubular type, supported vertically. It is mounted on springs to absorb all vibration. The engine is lubricated by a force feed and splash system and the chassis is lubricated by oil cups.

The frame is ¼ in. pressed steel stock, 6 6-16 in. wide with 3 in. flanges. It is reinforced by four cross members and substantially supported by gusset plates. All castings and cross members are hot riveted. Semi-elliptic, heat-treated, alloy steel springs are used. The front measuring 2½ x 42 in. and the rear 3 x 54 in. The front axle is a drop forging with Timken roller bearings. The steering gear which is mounted on the left side, is an adjustable worm-and-nut type with a 20-in. steering wheel. Both the spark and throttle controls are attached to column.

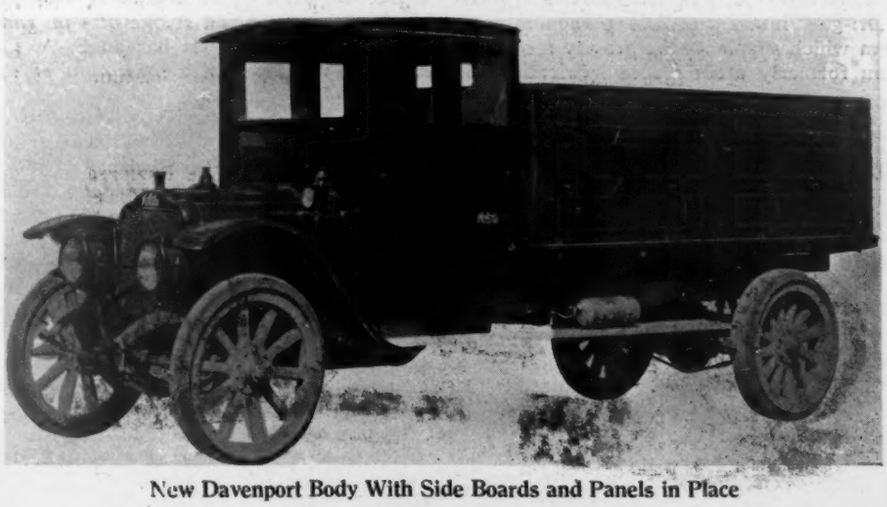
The artillery type wood wheels are equipped with 36x4 front, 36x7 rear tires.

The equipment includes two oil side lamps, tail lamp, horn, bumper, speedometer, seat, cushion and tools.

Combination Stake and Grain Utility Farm Body

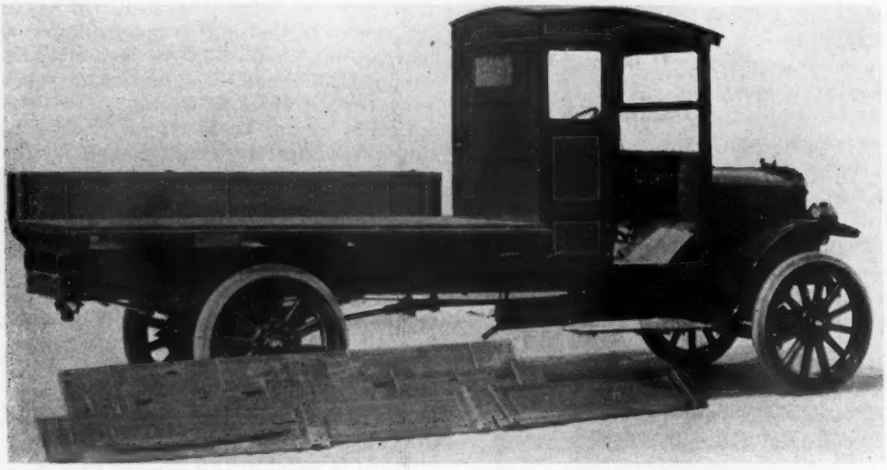
A body that can be assembled to meet any capacity requirement for grain haulage and that can also be converted into an ideal stake body is one of the new farm specialties recently announced by the Davenport Body Co., Davenport, Ia. The company is placing stress upon the production of this body so that it will meet successfully the varied needs of farm service. In addition to the manufacture of bodies for all makes of trucks, especially of the heavy-duty design, the company is offering a new cab designed to protect the driver in all kinds of weather, and a special stake body for heavy-duty trucks.

The combination body is built of hard wood; sills, undersills, frame and stakes of two-in. lumber. The side boards when removed will leave a platform that can be used for general farm hauling. This body is known as No. 200 and can be obtained in 5 x 8, 5 x 10, 5 x 11 sizes to fit any make of chassis. Special attention is given to the fitting of the lower side boards of the grain type body, to which are attached oak stakes that project through apertures along the edge of the platform. A grain tight fit is assured because the



New Davenport Body With Side Boards and Panels in Place

lower board fits into a groove in the platform. After the first side board is assembled it is a simple matter to build up the body to the height desired by merely placing the next board or panel above the first, securing it by inserting the projecting stakes into retaining straps on the first panel. The end gate, as may be seen in the accompanying illustration. is also of practical construction, allowing an easy removal for loading and unloading. If the nature of the haul demands a stake body, the panel may be disassembled and stakes 30 in. long provided for this purpose attached.



Davenport Body With Some of Side Boards Removed, Making It Into a Platform Job

The all the year around cab manufactured by this company and known as Model B-5, is comfortable and roomy. They are made 50 x 50 in., 56 in. or 50 in. wide, according to the seating capacity desired, and 58-in. high. Cab is made with or without doors to fit any make chassis.

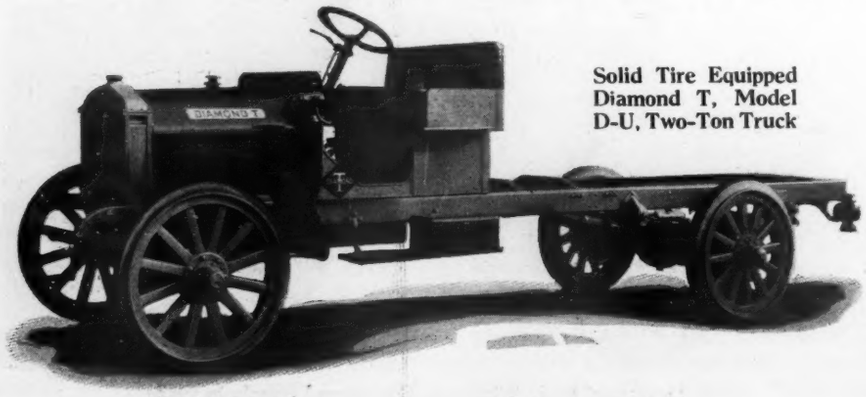
It is built of seasoned wood and reinforced by iron braces where necessary. This body is well built and capable of withstanding the excessive vibration frequently incurred upon rough country roads. The windows on both sides are adjustable and may be dropped when desired. Ventilation is also provided by an especially designed windshield. A lazy back with cushions is sure to afford satisfactory comfort to the driver.

The stake body, especially designed for heavy-duty trucks and known as Model G, is made of 2-in. and 3-in. oak boards accurately fitted and well ironed around the frames and floor and has heavy stake pockets. It is 5 or 6 ft. wide and may be obtained in 12 or 14-ft. lengths.

Diamond T Brings Out Another New Model

The Diamond T Motor Car Co., Chicago, Ill., has just announced another new job of 2 tons capacity, known as Model D-U. Many new features are incorporated in this truck, among which are: A four-speed transmission, a special "Dri-gas" intake manifold, a vacuum system which supplants the gravity feed system formerly used; forced lubrication to all spring shackles and bearing carriers for the propeller shaft.

This truck is empowered by a unit power plant suspended from three points, with a ball and socket joint for the rear engine support. The engine is cast in block with a bore and stroke of 4 in. and 5¼ in., respectively. It has an S. A. E. rating of 25.6 hp. and a maximum of 43 hp. at 1800 r.p.m. It is of the movable head type and valves are all on one side.



Solid Tire Equipped Diamond T, Model D-U, Two-Ton Truck

Power is transmitted from the engine through the clutch to a four-speed transmission, which gives an unusually low reduction of 4.7521 on low. Other gear ratios are as follows: Fourth, 1 to 1; third, 1.60 to 1; second, 2.69 to 1, and reverse, 5.95 to 1. All gears are of nickel steel with wide tooth faces.

The use of a special Diamond T bearing carrier, which is new on this model, is said to eliminate shaft whipping. Double universal joints are used between the transmission and rear axle with a slip joint to allow for spring action. The Thermoid-Hardy type of universal joints is used between the clutch and bearing carrier. The rear propeller shaft, between the bearing carrier and rear axle, is equipped with the standard all-metal Spicer universal joints.

Carburetion is through a Stromberg carburetor equipped with a dash adjustment to facilitate starting. Gasoline is fed through the carburetor by the vacuum system. The special "Dri-gas" manifold and the design of the combustion chambers and intake passages are claimed to obtain the best possible efficiency and economy from the low grades of gasoline now on the market. Ignition is by a Bosch high-tension D U-4 magneto.

Similar to all other Diamond T trucks, the Hotchkiss type of drive is employed. The chrome-vanadium steel, semi-elliptic springs consist of nine leaves and are 2½ in. wide by 40 in. long in the front, and twelve leaves, 2½ in. wide by 53 in. long, in the rear. The spring shackles are quickly and surely lubricated by the Alemite process of forced lubrication. Oilless bushings, bronze impregnated with graphite, are used as bearing surfaces for brake cross shafts, starting crankshaft and foot pedals.

The tires are solid, 36 x 4, front, and 36 x 7, rear. This truck weighs 4800 lb. The equipment includes a Klaxon horn, a special governor built into the engine, hubodometer, heavy steel front fenders, oil side and tail lights, complete set of tools, tool box and seat.

New Cadillac Plant Ideal

DETROIT, MICH., Jan. 30.—The new plant being built by the Cadillac Motor Car Co. is on a 46-acre tract of land which is admirably situated on the main line of Michigan Central Railroad on one side and on freight tracks of Lake Shore & Michigan Southern on the other side.

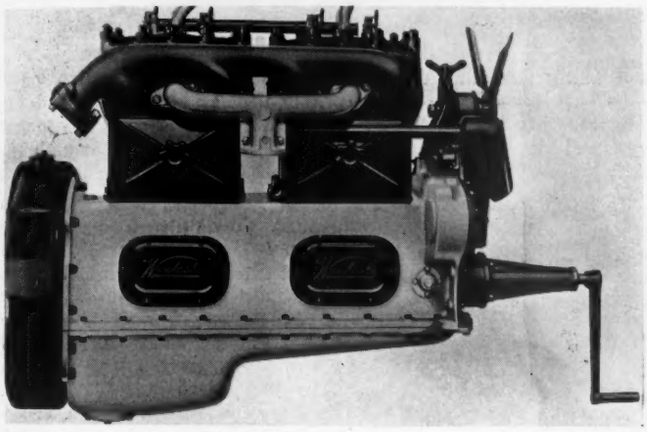
The buildings will be four stories in height and so constructed that, as expansion becomes necessary, two additional stories may be added. The floor space of 2,100,000 sq. ft. is equivalent to about 48 acres. Eight buildings are to comprise the factory, the largest of which will be the manufacturing building which is planned to be 800 x 600 ft. with a floor space of approximately 970,000 sq. ft. Other buildings include those for heat treating the metal, for storage, for assembling, etc. Every provision is being made for handling 7000 men.

TRUCK EQUIPMENT AND APPLIANCES

New Models Added to Waukesha Line

Interchangeability of Parts, Big Feature in These New Jobs

THE Waukesha Motor Co., Waukesha, Wis., has recently added four models to its High Torque Series, and this new line of engines is now being offered to meet the requirements of the truck and tractor industry in the following sizes: Model FU, 4 x 5¾; Model CU, 4⅜ x 5¾; Model DU, 4½ x 6¼, and Model EU, 5 x 6¼. They are all 4-cylinder engines, constructed along similar lines, having removable cylinder heads, force-feed lubrication and are built throughout to stand continuous heavy-duty service.

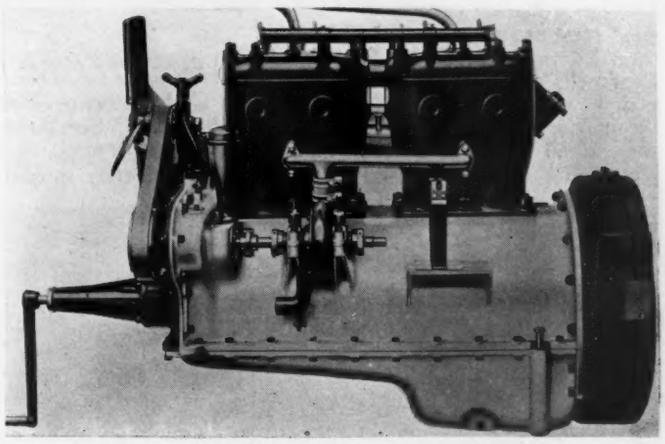


Right Side of One of Waukesha's Latest Models, Showing the Separate Intake and Exhaust Manifolds. Access to the Main and Connecting Rod Bearings is Afforded by Two Hand Holds in the Crankcase.

Particular attention has been given to the producing of a line of engines, each having the least number of different parts possible, and all of the four models having the greatest number of interchangeable parts without sacrificing accessibility or strength. The significance of this feature can be easily appreciated by those persons connected with the service end of the industry, as satisfactory service can be maintained by users of two or more of these series with a proportional small stock of parts.

These engines are furnished to accommodate unit or individual construction and are suspended from three-points. Standard S. A. E. pads are provided for application of starter equipment and any standard make of magneto can be installed. The distributor can also be mounted when required. The cylinders are cast in pairs, each cylinder block has separate removable cylinder head. The crankcases are made of aluminum and the oil pan may be dropped from the crankcase without disassembling the gear cover or rear support from case.

The crankshafts are of chrome nickel steel and have long and large diameter bearings. The crankcases are made undown a number of parts required in stock for service work.



Left Side of the Waukesha Engine, Showing the Pair Cast Cylinder Blocks, Each With an Individual Removable Head, Water Pump, and Bracket Cast Integral, With the Aluminum Crankcase for the Mounting of the Magneto.

Either a separate intake and exhaust manifold or integral hot spot manifold for the burning of low grade fuel can be furnished.

Water circulating pump has bronze impeller and is mounted on brackets, which are part of the crankcase and this assembled unit can be easily removed. Bronze packing glands are used to prevent water leaking about the pump shaft. Large water spaces are provided for the cooling of the cylinder and the cylinder head. One drain cock below water pump, is provided for draining the entire water system if desired. The fan driving pulley is assembled on the pump shaft and a roller bearing is used to carry belt load.

The force-feed oiling system embodies a geared oil-pump driven from the camshaft. The oil is delivered to the three main bearings through heavy annealed tubing. The oil is then carried to the connecting rod bearings through the drilled crankshaft. The oil pump may be removed as an assembled unit and can be easily replaced. A reamed hole in the crankcase locates it and insures proper alignment of driving gears.

By removing one nut the oil pump screen may be taken out, through the hand hole at the bottom of the oil pan, for cleaning. The relief valve for regulating the oil pressure can be adjusted from the outside of the crankcase and the surplus oil from the escapement valve is thrown on to the timing gears. The breather has a large opening and heavy lubricating oil can be poured into the engine quickly through this part.

Roller type valve lifters are used, which are a hollow hardened steel shell of large diameter, very light and running in individual cast iron guides.

The pistons are long and light with large bushed bearings for piston pins. This pin is clamped on to the upper end of the connecting rod in such a manner that the clamping screw tightens pin only and does not carry any part of the load.

Ray Tire & Rubber Co., Chicago, Ill., are planning to build a factory at Birmingham, Ala., which will have a daily production capacity of 25,000 interliners for puncture proofing automobile tires. The buildings will cost about $250,000.

Stearn Introduces New Heavy-Duty Engine

THE fact that manufacturers are demanding an engine that has extra power for the exceptional work that sometimes it is called upon to perform, is the basis upon which the new Stearn "extra reserve" engine is built. This new model is known as the AU and is manufactured by the Stearn Motor Mfg. Co., Ludington, Mich.

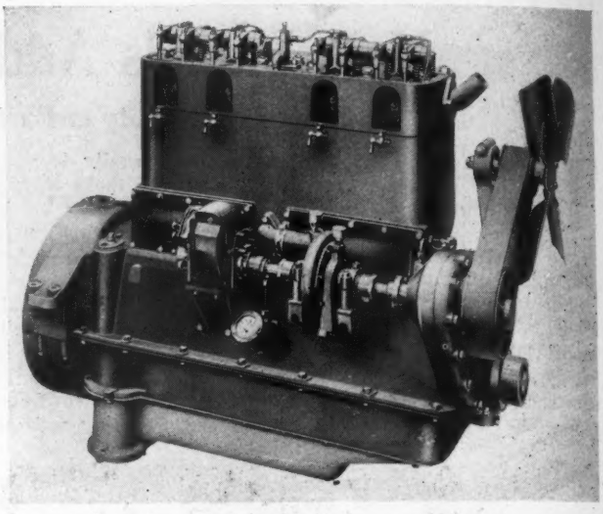
This engine has undergone extreme tests conducted at the Armour Institute of Technology, it was demonstrated that, at between 800 to 900 r.p.m. the engine showed a fuel consumption of 8 pt. per hp.-hr. According to the company it developed 40 hp. at 800 r.p.m. and as much as 60 hp. by speeding the engine up under severe conditions. It is of the valve-in-head type.

There are four gray iron cylinders cast in block. The pistons are of the same material. Three rings are on each piston, the lower one acting as the oil ring. The wrist pin is .20 carbon steel and the wrist pin end of the rod holds a bronze bushing.

Main and connecting rod bearings are bronze-backed babbitt-lined and all bearings are ample in size. The main bearing caps are set in the crankcase ½ in. The crankshaft is 2⅞ in. in diam. and has three main bearings.

The engine valves have a diam. of 2¼ in. The valves tappet is the roller type of nickel-steel, hardened and ground. The rocker-shaft mechanism is supported by two brackets. Rocker levers are hardened steel at the valve end and are threaded on the other end for valve clearance adjusting screw. The rocker shaft is seamless steel tubing through which oil is forced under pressure to all rocker bearings. This eliminates all the grease cups.

The camshaft runs in three bronze bushings and a large flange on the camshaft takes up end thrust in conjunction with the front bearing.



View of the Stearn Model AU Engine, Showing Assembly of the Magneto and Water Pump. The Convenient Determining of Oiling Condition Can be Ascertained by the Oil Gage.

The engine has a removable cylinder head. Large water spaces are provided. The valve-stem guide bushings are pressed into the cylinder head and can be replaced easily.

Unassembled Piston and Connecting Rod Parts

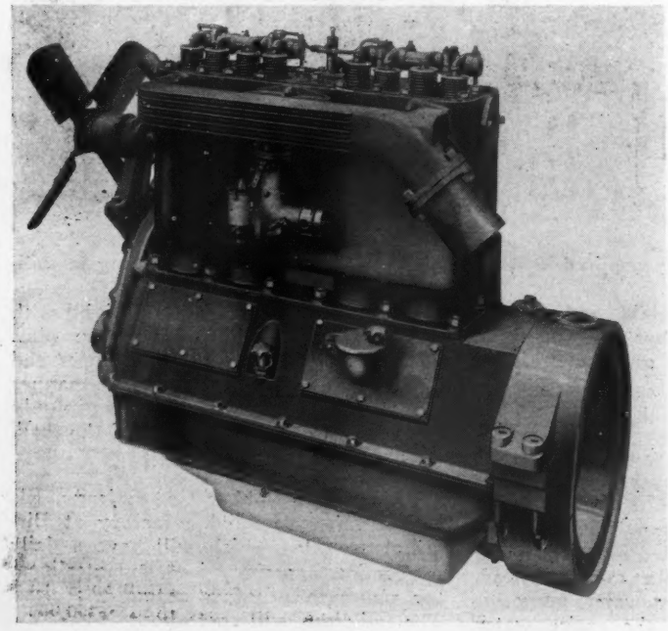
Lubrication is through a pressure system. When the engine is warm a pressure of 25 lb. is maintained by a pump completely submerged in oil. The pump and its drive are a unit and can be removed by taking out four cap screws which bolt it to the crankcase and to the main oil header. This is a steel tube cast integral with the crankcase which eliminates practically all leakage by doing away with oil tubing. From this lateral oil passage the oil is forced through the hollow crankshaft to each connecting rod bearing and to each wrist pin bushing. Oil is also forced through a copper pipe to a pressure relief at the top of the cylinder head. The timing gears are lubricated by the overflow from this pressure relief. The camshaft is lubricated by spiral oil grooves supplied with oil by the splash in the crankcase. The engine is equipped with a bayonet-type oil gauge and with a high and low lever cock. Strainers are placed in the oil filler.

The breather is at the top of the engine. A diaphragm in the breather prevents any inward suction.

Water is circulated by a centrifugal water pump which is supported by two brackets bolted to the crankcase. The pump and fan are driven by a large shaft. At the outer end of this same shaft the fan drive pulley is placed.

The fan is 22 in. in diam. It is a steel stamping and runs on Hyatt roller bearings. Adjustments can be readily made.

Hot spot inlet and exhaust pipes are cast integral. The carburetor is 1½ in. S. A. E. The engine can be equipped with a standard governor. The engine is made in two types. Type AU has bell housing; Type A is the open flywheel design.



Left Side of the Stearn Engine, Showing Carburetor Attached. Simplicity and Accessibility in Design Are Evidenced in This View.

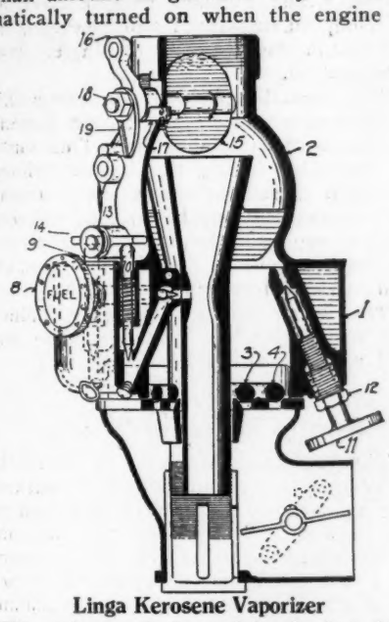
A Large Southern Order for Acasons

A contract was recently closed by J. C. Bonner, of the Bonner-Acason Co., of Newport News, with the Atlantic Salvage Co. for a large fleet of 2½-ton Acason trucks. It will be known as the "Yellow Fleet" and will be employed in the salvaging of southern army camps.

Linga Kerosene Vaporizer

The Linga Kerosene Vaporizer, manufactured by the Specialty Brass Co., Kenosha, Wis., is a carburetor adapted to heavy-duty gasoline engines such as tractor, airplane and marine. A provision is made in this vaporizer for the retaining of kerosene, gasoline and water in one bowl. Although kerosene is the standard fuel, gasoline is used for starting and while slow speed running. The water is ejected at one-third load and the proportion increases as the load increases.

The kerosene and gasoline is led to a common fuel needle valve. The fuel passes from the respective compartments to the fuel needle valve point, being calibrated to offset the different fluidity of the fuel. Instantaneous switch from one fuel to another may be made at any time. An appreciable feature is that an adjustment can be permanently set so that a small amount of gasoline may be automatically turned on when the engine is



Linga Kerosene Vaporizer

This carburetor is featured by the fact that provision is made in the one bowl for kerosene, water and gasoline.

idle. Other features are the single air intake metal float and the fact that it has two adjustments, the fuel valve and the water valve. Easy starting is facilitated by a choke valve, another provision of this vaporizer.

The accompanying illustration affords a comprehensive idea of the inter working and mechanism of this device. The air is admitted into the carburetor through vertical slots at the bottom. Fig. 8, the accompanying illustration, shows the fuel needle valve, common for both fuels. The fuel switch is composed of four parts, the erector arm, No. 13, the thumb and nut, No. 14, and the two switch needles, Nos. 9 and 10. When the erector arm, No. 13, is tilted to the left the switch needle, No. 9, closes down its seat and switch needle, No. 10, lifts and admits gasoline to the opening into the venturi. When the rocker arm is tilted to the right opposite action takes place; when in the center both fuels are admitted to the venturi. The switch needle, No. 9, has a stronger spring than needle No. 10, so that the kerosene passage is ordinarily opened and the gasoline closed. When starting on gasoline the rocker it tilted to the left and held there by tightening the thumb nut, No. 14. The lug, No. 19, on the throttle shaft may so set that it strikes the rocker arm when the throttle closes, thus switching on a small amount of gasoline when the engine is running with a light load.

Fig. 11 is a needle valve, which is adjustable and supplies water from one-third load on upward, increasing as the load increases. These vaporizers are made in four sizes, 1¼, 1½ and 2 in., and sell at from $16.50 to $24.

Columbia Unit Dry Battery

The National Carbon Co., Inc., Cleveland, O., is offering to the trade a new unit dry battery. As the cells of this battery are permanently connected internally by strips of copper soldered between terminals, short-circuiting is not only practically impossible, but it also eliminates the necessity of connecting and continually adjusting the connections experienced in the assembly of standard dry cells. It is known as the Columbia Hot Spot and is moisture-proof, allowing its use in damp and wet climates without injury. These batteries are made in 21 different types.

Solid Tire Equipped Wrecking Truck

The Continental Wrecking Trucks equipped with solid rubber tires, announced by the Continental Auto Parts Co. of Columbus, Ind., are equipped with a special patented saddle.

The axle is of chrome nickle steel and has Hyatt roller bearings, encased. The saddle fits the differential housings with provisions for fastening in by drawing a rope or chain over the rear axle. This same saddle may be attached to the front axle if necessary, by a clamp provided for that purpose.

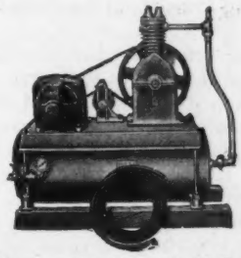
Continental Wrecking Truck

Any tendency to keel or the possibility of damage to truck when going over rough roads is said to be prevented by the long bearing in the frame of the truck which supports the saddle posts. Any height may be obtained by adjusting the saddle posts and there is also a telescopic tongue which permits the truck to be used to support the front or rear of the car. Model R equipped with rubber tires 3 in. solid and 3 x 16 in wheels, retails at $75. Model S which is identical to Model R but for the steel wheels, retails at $50.

Curtis Introduces New Air Compressor

The products of the Curtis Pneumatic Machinery Co., St. Louis Mo., are based on the fact that the inflation of pneumatic truck tires does not require enormous pressures. As a matter of fact the average tire requires about 130-lb. pressure at the most, it is simply a question of volume.

The two new products of this company are the type V and Y. Type V is a motor-driven outfit, belted or geared, and is very similar to the Style X. The compressor is the service Model B, motor is an AC or DC, as specified, and the tank provides a maximum pressure of 150 lb. and is equipped with a gage and valve. A 15-ft. air hose with tire chuck is included in this outfit. This apparatus is mounted on 4 x 4 in. hardwood skids. The motor and compressor are mounted above the tank. Prices vary, according to the tank and motor.



New Stationary Curtis Style V Compressor

Style Y, which may be obtained in either the portable or stationary type, is made gear driven only. It pumps direct to the tire and is not made for continuous or tank service. The portable Y 1-A outfit comprises a No. 1 Model B1 compressor, a ¼-hp. motor, either AC or DC, 20 ft. cord with Edison base plug, expansion chamber with chain plug, 15 ft. air hose with tire chuck and gage mounted upon a hardwood base, which has large easy running wheels, a push-bar handle and a rack for the wire and hose. The price is $130. The stationary model sells at $125 and is modeled the Y 1-C.

Motor Oils

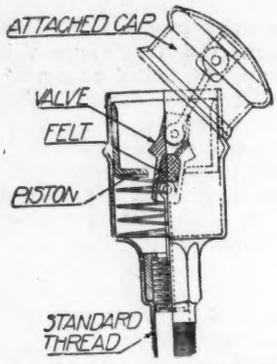
The line of motor oil marketed by the Motor Oils, Inc., 56 E. Randolph St., Chicago, Ill., known as the "88" line of motor oils and greases, includes Motor Oil, Gear Compound and Cup Grease.

The Motor Oil is for use in the engine and is claimed to contain excellent lubricating qualities and to be free of sediment. The Gear Grease is of such a consistency that it forms a coating over the gears and bearings. It is a semi-liquid and has no artificial body or anything that will reduce its lubricating value. It is sold in 5 gal. pails retailing at $2.50.

The Cup Grease is an effective lubrication for cold surfaces, such as spring joints, steering knuckles, rod bearings, fan bearings, etc. It can be obtained in 1 lb. cans or 5 lb. pails, selling at $0.25 and $0.35 per lb., respectively.

Felix Constant Lubricating Oil Cups

The Felix Mfg. Co., 4437 N. Clark St., Chicago, Ill., has introduced a new oil cup of simple construction. It is featured by the fact that it can be used to flush out the bearings or to supply, as well, a continuous flow of oil.



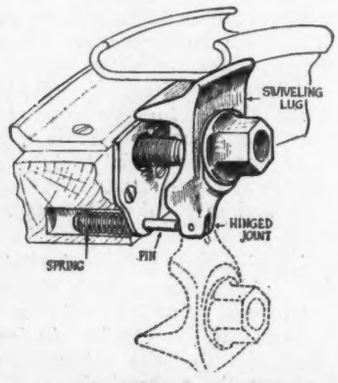
Showing Principle of the Felix Oil Cup

The cup can be readily filled by raising the cap until it clears the valve. The cap can be tipped to any desired direction—this motion opening the valve and the bottom of the reservoir piston. Oil is then admitted to the cup, after which the cap is snapped back into place. This will close the valve and the oil cup and force the oil below the reservoir-piston and to the various points on the bearings. The oil is drawn from the closed reservoir-piston at the rate of a few drops per day. If desired, occasional flushing of the bearing is accomplished, by lifting the cap up then letting it go, after which it resumes its former function. Not only are these cups dust and water proof but they are easily accessible when filling.

Neverlost Rim Lug for Wheels

An improved rim lug, known as the Neverlost, has been announced by the Auto Products Co., 1780 Broadway, New York City. This lug is to be permanently attached to the wheel. It consists of a lug of the wedge or flat type with a combination non-loosable and detachable nut, and a spring-backed pin provided with a swivel joint to secure the lug to the wheel felloe. To remove the rim it is only necessary to extract the nut lug combination allowing the device to drop beneath the outer circumference of the felloe. The accompanying illustration shows clearly the result of removing the nut lug combination. The maker states that that section of the device immediately beneath the projecting lug provides an unusually long contact. Also the spring on the pin acts as a lock, preventing the lug from coming out, while the pin itself prevents the lug from turning in any direction.

Moreover, when the nut is worn it can be detached from the lug and therefore, it is unneccessary to replace both the nut and the lug. By simply drilling into the felloe, these lugs can be attached on all wheels of any type.



Neverlost Rim Lug Attached

Milwaukee Hand Pump for Filling Gasoline Tank

An effective method of filling the gasoline tank is afforded by the new product of the Milwaukee Tank Works, Inc., Milwaukee, Wis. This hand operated pump is known as the Type 36, Five-Gallon Rapidelivery Speed Pump.

Milwaukee Hand Pump

It is claimed that 15 gal. of gasoline can be discharged in a minute, without any special effort.

Adjustable measuring stops enable the operator to accurately draw one, two, three, four and five gal, at a single stroke. To deliver five gal. of gasoline it is only necessary to turn the crank 12 times, to return the plunger but two revolutions in the same direction are required. The handle is always turned forward when delivering or for returning plunger. A meter is included in the equipment and records the amount of gasoline delivered. Incorporated in this pump is a filter which removes water or particles of dirt from the gasoline. A counterbalanced cover may be raised, locking the hose nozzle on the inside, when not in use.

A meter, filter, 10 ft. of ¼ in. metal hose, portable filling nozzle and electrically illuminated sign are included as standard equipment. The price of this pump with a 250 gal. tank is $397.

A motor of ¼ hp. requiring 110 voltage A. C. or D. C. current may be obtained as extra, eliminating labor, for $198.

Water Pump Metallic Packing

A packing, for vapors such as steam, air, ammonia and for other acids, known as the Crane Flexible Metallic Packing, is being manufactured and marketed by the Crane Packing Co., 18 Huyler Ave., Chicago, Ill.

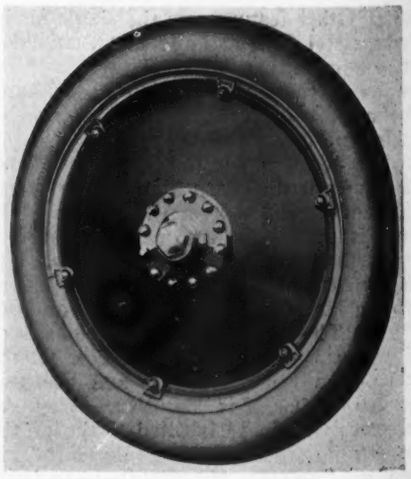
Constructed of Babbitt Ribbon

This metallic packing for automobile water pump service is a babbitt bearing to the water pump shafts. This outfit is made by taking the babbitt ribbon wrapped spirally about a core, having pure graphite lubricant inserted between each wrapping or layer. When completed the wrapping is flexible, compressible and has excellent tensile strength.

This water pump packing is claimed not to be affected by temperature and will not become hard.

Spring Seats for Trucks

The Sagless Auto Seat Co., Inc., 2210 S. Wabash Ave., Chicago, Ill., is marketing a novelty constructed seat known as the Sagless auto seat. This seat incorporates cushions and shock absorbers assembled in such a manner that the driver is practically riding on spring cushions held in suspension.



A New Indestructible Wheel

The accompanying illustration shows the new Indestructible Wheel brought out by the Indestructible Wheel Company, Lebanon, Indiana. This wheel is for passenger cars and light trucks, and is equipped with a demountable rim, but is not demountable at the hub.

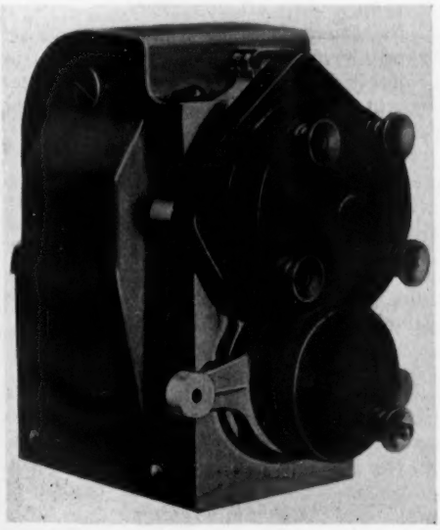
SERVICE AND REPAIR DEPARTMENTS

Factory Methods Employed by Splitdorf Company in Testing Aero Model 448 Magneto

By C. P. SHATTUCK

BEFORE describing the systematic methods employed at the factory of the Splitdorf Electrical Co., Newark, N. J., for testing a magneto returned to the factory when claim is made that no spark can be obtained, a brief description of the magneto is logical in that it will assist the mechanic whose ignition experience has been largely confined to the conventional types.

Although the instructions contained herein are those for testing the Aero Model 448 magneto, which supersedes the Dixie, the principle of current production is similar and, therefore, the directions can be utilized with either type of magneto. The principal components of the magneto are a pair of magnets, a rotor, a field structure, a winding, an interrupter, a condenser and a distributor. The rotor, which is the only rotating element, is surrounded by a field structure which carries laminated pole extensions, on which the winding with its laminated core is mounted. The condenser is mounted directly above the windings and both are stationary. The interruption of the primary current (break or separation of platinum contacts) is by a cam attached to the rotor shaft, but the breaker mechanism is stationary; that is, it does not rotate. The breaker base and its components do, however, rock with the field structure, obtaining equal intensity of the spark at all timing lever positions. The stationary winding is secured to the field pole structure by screws, and the condenser, mounted directly above the winding, is also screw retained.



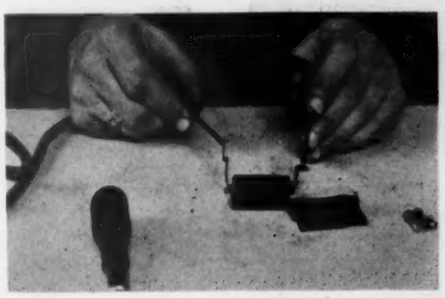
Splitdorf Aero Model 448 Magneto, Showing Side-Plate Stud Securing Side Plates and Screws Retaining Distributor Block.

The instructions contained herein do not include all tests made by the factory or its appointed service stations, but comprise steps that may be taken by the truck mechanic. If after completing the directions, which are illustrated, the magneto fails to function properly it should be returned to the factory or the nearest factory service station.

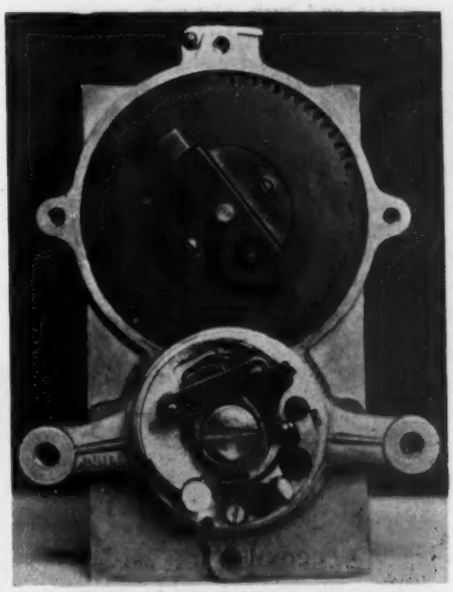
Reserve Tools for Magneto Work

The tools or equipment essential for the work comprises a 2½- and a 4-in. screw driver and an incandescent lamp and cable, the last named being utilized for testing the condenser. The screw drivers should be clean or new and it is suggested that they be set aside for magneto work only. The regular shop tools are likely to be dirty and dirt should be avoided when repairing magnetos.

When a magneto is received at the Splitdorf factory from which a spark cannot be obtained the method of procedure is as follows: **Remove the thumb nut and washers from ground stud** and **displace breaker cover. Test action of breaker bar** (movable contact member). It should move freely on its bearing and should not rub or contact with breaker base. A sticking breaker bar is always due to lack of lubrication at the bearing. The bar carries a bronze bushing rising on a steel stud and requires a small amount of oil. There is a felt wick inside of the steel stud which holds the lubricant and regulates its supply to the bearing. This bearing should be lubricated but not flooded. Use of too much oil may result in the oil being deposited on the platinum contacts. Turn rotor shaft and note action of breaker bar.



The Condenser is Tested by Connecting It With a Lamp in Circuit, in Series. If Lamp Lights, Condenser is Short Circuited.



Showing the Distributor Brush and Method of Retention and Breaker Mechanism Which is Stationary

Separation of contacts is by cam on revolving rotor shaft. Adjustment of contacts is by loosening lock screw and turning contact screw.

Simple Way to Clear Contacts

Rotate or turn rotor shaft until contacts close, are together. With index finger of left hand press down on breaker bar to **separate contacts.** Cut a strip about ⅜ or ½ in. wide from a clean business card and **insert card between contacts.** Remove index finger, allowing contacts to grip card. **Move card up and down,** remove, and use a new and clean strip, repeating operation until card shows no discoloration. This

The Platinum Contacts Are Best Cleaned by Inserting Strip of Business Card and Moving Card Between Points.
This will remove oil mist and other foreign elements.

method will remove all oil as well as other foreign elements and will clean contacts as well. Avoid use of file.

Turn rotor shaft until contacts are fully separated or open. Use a .020 of an inch thickness gauge for testing gap. Insert gauge between contacts, as shown in the accompanying illustration, but do not force gauge. It should fit snug. If too much or too little space exists corrects it. **Loosen lock screws** of fixed or stationary **contact** and **turn platinum screw** in or out as may be required. **Tighten lock screw.** Use the small screw driver for this work. Use gauge a second time to make sure gap or break is correct.

Note.—Always use a .020 of an inch gauge, never coins or other measures.

To Test Gap of Contacts Turn the Rotor Shaft Until Contacts Fully Separate and Insert Gauge.
Do not force gauge between contacts.

Distributor Easily Cleaned

Next **remove distributor block** by displacing its three screws with lock washers. Moisten soft piece of cloth, not waste. **with gasoline** and **wipe clean interior of block** with its segments to remove any foreign matter. **Test action of distributor brush** in distributor finger but do not remove brush or try and alter tension of the spring. Wipe contacting end of brush with cloth moistened with gasoline. If brush be damaged or broken, replace with new one. See that brush moves freely in holder or finger.

Clean Distributor Block With Soft Cloth Moistened With Gasoline and Wipe Dry.

Displace side plate rod with its washers and **remove side plates,** two in number, right and left. These plates and the upper cover or magnet cover are retained by eight screws and all have lock washers. Grasp the upper part of the magnets, right and left, and swing out and down to the position shown in an accompanying illustration, but DO NOT REMOVE MAGNETO.

Removing the Condenser

To remove the condenser first **displace screw with washer securing condenser** and the primary lead to winding, **also a second screw.** The condenser has two extensions with openings for the screws, can be replaced only in the correct way, and there is a strip of oiled silk placed between the condenser and the winding on which the condenser rests. **Remove screw and washer securing ground clip to pole structure.** (This screw is indicated by screw driver in an accompanying illustration.) **Lift off condenser.**

Statement is made that the condenser rarely gives trouble but it should not be roughly handled. To **test the condenser** is not difficult. Connect it to a 110- or 220-volt circuit, direct or alternating current, with an incandesant lamp connected in the circuit in series with the condenser. If the condenser is in good condition there will be no circuit through it with the current turned on and the lamp will **not light.** If the lamp burns it indicates the condenser is short circuited and it should be replaced with a new one.

Winding is Removable

To remove winding first **displace two screws and washers securing winding to pole structure.** Next **turn rotor shaft until the contacts just separate** or turn shaft until the magnetic resistance or pull is weakened. **Lift off winding.**

Illustrating Retention of Condenser, Winding and Relation to Field Pole Structure.
The screw-driver blade is in contact with screw retaining ground clip to pole structure.

To Displace Winding Turn Rotor Shaft Until Contacts Just Separate or Magnetic Resistance is Weakened.

Illustration also shows how magnets are slipped to one side but not removed, the condenser and its screws as well as those retaining the winding.

Note.—Unless shaft be turned as described it will be found that winding will cling to pole structure.

Test of Safety Spark Gap

The safety spark gap is located under the winding and a test may be made of the winding by giving the rotor shaft several quick turns to see if spark jumps the safety gap. This test should be made previous to removing the condenser screws or immediately after the removal of the side plates. The safety gap is safeguarded by a gap protector, a flat member of non-conducting material. This protector is interposed between the frame and magnets and has an extension that is slipped over a slotted member of the frame. The protector may be removed by grasping it at either end, and by alternately working the ends up and down. Inspect protector for cracks or breaks and replace with new if damaged.

In the reassembly of the parts see that the washers and screws retaining the condensor and ground clip are tight and clean. The collector brush of the distributor finger should move freely in its holder. This brush contacts with a brass strip on the winding, and in replacing the winding this brass member should face the breaker end of the magneto. The distributor finger is secured to the distributor gear by two screws and washers but there should be no occasion for removal of this unit.

Proper Spark Plug Gap Important

Too much emphasis cannot be laid upon the necessity of maintaining the proper spark plug gap. While the normal setting should not exceed .025 in. the only and correct method is to set the gap with the magneto gauge. And with some types of plugs the electrodes are not constructed of heat resisting material which results in the metal burning. With some designs the center electrode will burn in such manner as to make gauging difficult. The remedy is to disassemble the plug and turn the electrode through 180 deg.

There are three places for renewing the oil supply. Use four drops of light oil every 500 miles of operation in the oil reservoir in front or directly in back of top of distributor block, and two drops every 500 miles of operation in oil cup at rear. Reasons for lubricating the breaker bar have been given and the amount of oil should be one drop every 200 hours of operation. Apply with a toothpick to the breaker bar bearing.

Showing Gap Protector and Method of Removal. The Winding Displaced is Shown at the Right.

How Aero Differs From Dixie

The Aero Model 448 differs from the Dixie in that the rotating element in the former has four wings, two of north polarity and two of south polarity. The wings of the same polarity are joined together and set 180 deg. apart. The cam of the circuit breaker only interrupts the primary current when the wings of a given polarity are passing the field poles, the cam holding the platinum contacts open during the period when the wings of the opposite polarity pass the field poles. By this method the primary current flows only in one direction to obtain the induced current in the secondary winding. The secondary also flows in one direction only, with the result that all sparks at the plugs are "poled" or of the same polarity.

Few Spare Parts Necessary

Truck dealers maintaining repair shops are warranted in stocking certain spare magneto parts provided a factory branch or factory appointed service station is not within a reasonable distance. **Use of parts other than those produced by the manufacturer of the magneto should be avoided.** The following parts are recommended by the Splitdorf Electrical Co. for its Aero Model 488 magneto:

One No. 14802 Breaker Bar Complete.
One No. 8698 High-Tension Winding.
One No. 8429 Condenser.
One No. 14428 Gap Protector.
One No. 14792 Contact Screw with Platinum.

Something That Every Service Manager Should Read

By AL RAWSON*

THE three essential things in the sale of Service are: Co-operation, Personnel, and Good Work. The importance of co-operation in any organization has been overlooked by the majority of service men in not getting together and working shoulder to shoulder. The necessity of working in conjunction with the sales department is just as important as working in harmony with your own organization, and should be impressed very strongly on every one. The sales department makes the first sale and then the service department is the goat. They have sold the man and we have to deliver what the salesman promises. How often that happens. They tell the owner the car is guaranteed for ninety days and the service station will take care of everything but accidents. The car was guaranteed for thirty days. Mr. Customer comes back when his car is about two

*Paper read at Automotive Service Association Convention at New York, January 5. Mr. Rawson is president of the Automotive Service Association of Newark and in charge of the service station of the Reo Motor Car Company of that city.

months old and the service man has one good job on his hands to satisfy him, so that he feels he is getting a square deal.

Service Sells Cars

The average service station resells at least 75 per cent. of the automobiles on the road today, and we are not working to our full capacity because we lack co-operation. Sometimes it is hard to find out what the salesmen say, but by working with them—co-operating, and getting them to see our side of it as well as to look at theirs—the two organizations, because there should be two, will work more harmoniously.

The personnel of an organization is a hard matter today. In selecting a man for a certain position, make it a practice of picking from your own force, train him, give him encouragement in the way of advancement, and in that way a great deal of difficulty will be overcome, as he will know you are working for his interest. The tendency in the automobile business has been to play favorites, picking out friends and giving them good positions.

Should Favor Own Men

The time is coming soon, at least I hope it will, when the dealer will wake up to the fact that they have men working for them who are competent to handle bigger jobs if given an opportunity. Look around your organization if you want a man for shop foreman, you will find one and also find he has some good ideas. Good workmen is the keynote, and can only be accomplished through co-operation. A good man is cheap. No doubt we have felt that if we could get along without paying a man so much money we would make a larger profit, but when it is simmered down, cheap labor is a liability and good labor an asset.

Service Men Are Salesmen

Many service managers are under the impression that they are not salesmen. We all sell. I used to think I could not sell a postage stamp until six months ago. A very good opportunity was presented to me outside of the automobile business. The man that made this proposition wanted some one with sales ability, so I said, "Why pick on me, I'm not a salesman." He answered, "Yes, you are, you are selling one of the hardest things I know of and that is service."

Have you fellows ever looked at it in that way? I woke up. Then I became convinced that I was not only selling service, but selling myself to everybody that I came in contact with, and firmly believe that that is what we do every minute of the day. All our friends have been buying our personality—not for a monetary consideration (they wouldn't be our friends if they did)—and our enemies buy—well, it is hard to tell what. The better we sell ourselves to our employers, the more we get in the pay envelope. They say a man is judged by the company he keeps, which is very true, but he is judged more by the way he sells himself than by the company, because salesmanship can be built up and improved upon and a man can come back strong if he uses the right kind of tact.

Value of Cleanliness

The first thing that impresses the customer when entering a service station is its appearance. A clean shop is just as important as good work, because every man realizes that things have to be clean or he will not be particular and turn out the best grade of work. You know, if you have a dirty place, that men lose the spirit of "Cleanliness Is Next To Godliness."

The next impression will come from the man who takes the order, a service salesman. Most of us have elevated our men to that. He should be one of the most important members of the organization. He is the fellow the customer sees first. The majority of service managers think that an ordinary clerk who can take an order is all they need. I differ with them.

The service salesman need not necessarily be a first class mechanic, or expert in the stock room, but fairly well informed, so that he can talk intelligently; have a good idea of the parts required; length of time needed to do the work and thereby enable the customer to get an approximate idea of the completed job. This would work out different on the flat rate system.

The Service Salesman

A neat, clean-cut, gentlemanly service salesman will give the customer the idea that the organization is composed of the right kind of men—not the kind with a dirty collar and who need a shave. You do not want that type of man. The customer leaves his order feeling that he is going to get a square deal, and with good will towards the company. Service salesmen come in contact with all classes—the wealthy as well as the hard worker—therefore, it is necessary for him to be educated, so he can put himself on the same plane with them. You have to get down on a level with some of them and use rough methods, some like it, then again one comes in worth thousands and your salesman should be competent to talk to him in the way he likes to be talked to.

A salesman should always be courteous, polite and neat in appearance. My men today can give the prices on about 75 per cent. of our work and hardly bother me at all.

The sale having been made the car goes into the shop. Try to keep the customer and shop as far apart as possible, only in special cases should the customer come in contact with the shop foreman. We all know the necessity of proper handling of work tickets, checking time and material to eliminate errors and also of good workmanship. A clean shop goes with good work.

During my travels around New York I noticed a sign: "Clean work—clean shop—clean talk." Those six words mean a great deal and will do as much as anything else to put us on the right footing.

When the customer comes back for his car the service salesman should be able to call him by name. It makes him feel good. You all know if you go into a store and have a clerk wait on you who says, "Good morning, Mr. So and So," and you have only seen him three or four times, he has done a great deal towards selling you. He has studied you, taken enough interest in you to find out who you are, which is just as important in a service station as in a store.

Courtesy Needed in Parts Department

Do any of us realize what a great volume of business we do through our parts department? If it was not for good men handling that department service stations would never be able to pay the way they do today. It is just as essential to have prompt and courteous treatment there as in the shop. Go into some places—it is a crime the way they talk to customers. Lack of attention, uncivil answers, the clerk knowing the customer has to buy there.

If the service manager would fully realize what it costs to handle complaints, they would pay more attention to smaller things and in that way eliminate the biggest part of their troubles. We should be ready and willing at all times to meet customers and see that they are properly taken care of.

Many employers think you should attend to detail work and watch practically every move the employees make. It can't be done. Make it a point to go over work tickets on completion and know that the customer has not been over charged. It takes about 30 minutes a day.

Need of Reserve Heads

It takes time to build, and I for one, am not finished, just started. Have a reserve man for each important place. A one man organization is all wrong. A reserve service salesman, head tester, shop foreman and one or two in the stock room will make you independent of sickness, accidents, etc.

Just a word about the employee. Most of us overlook the fact that they are human, so let us work with them—help to educate them—make them more valuable, not only to themselves, but to the company. Impress upon them the necessity of being courteous, straightforward and always doing what is required—train them to do their work and the idea in front of him that you are advancing your own organization instead of going outside for new blood. Then they will realize the necessity of giving you dollar for dollar value. Have found it a mighty good thing to get them together and have a talk and have had many good ideas from them. We hold a school once a week and the boys take a great deal of interest in it. They realize more and more every day that the company is not only trying to make more money (which it is entitled to) but that it is trying to help the men make more for themselves. I have decided that I am not going outside of my own organization for men for special positions. Will boost my own and they will work harder for me and do better work.

The Vim Method of Helping Dealers in Small Towns

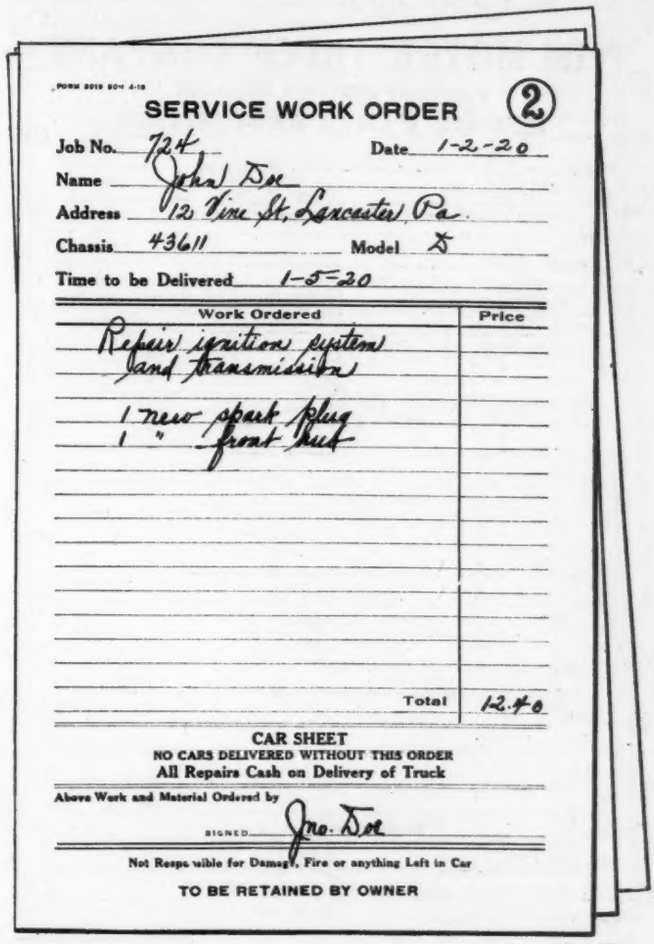
This Article Explains a Simple Stock-Keeping System and Practical Routine to be Followed in Repairing Trucks

As the use of motor trucks for transporting merchandise increases and trucks become more generally used in small towns and rural districts, the problem of rendering service to such trucks becomes one of the difficulties the manufacturer has to solve in order to overcome a great amount of sales resistance. The Vim Motor Truck Co., realizing the importance of being in touch with every truck owner, is developing a service organization based on the principle that every truck owner should be made a member of the sales organization by having him satisfied with his truck and enthusiastic about its performance. He will then talk "truck" to his friends and business acquaintances and through his recommendation the prospects for new trucks with whom he has come in contact, are more than half sold to the particular truck which he operates before he is approached by the salesman. This not only promotes the use of motor trucks for transportation, but also the trucks of the manufacturer operating under this plan.

Preliminary Steps Include Census of Trucks in Service

The first step in this plan is to keep an accurate record of the location of all trucks in service. This will indicate the territory where one or more trucks are in operation in towns or districts which are not readily accessible to an established dealer. From the Chilton Trade List a special list is then compiled of such garages and repair shops which might be suitable for service stations. With this data in their possession, specially trained men from the factory service department, called service promotion men, are sent out to investigate the ability, equipment and general standing in their immediate vicinity of these garages. A selection is made and the garage owner is appointed a service dealer. He is provided with a special sign, parts catalogue, parts ordering forms and other literature which will help him to inspect and repair Vim trucks. A stock of parts is established at this service station in proportion to the number of trucks in the territory. If the garage owner does not already have an efficient method of keeping a record of the work which he does and the parts which he sells, these service promotion men provide him with the simplest possible system and stay with him long enough to see that it is properly established. The simplest of these systems which is practical for a garage employ-

Right: The Service Work Order, Made Out in Triplicate. One of these is printed on cardboard, and is placed inside of the leather case, and is then attached to the steering wheel or part of truck to be repaired. The three sheets are all the same, except that the cardboard sheet that goes to the shop has a space at the bottom for inspectors to check. Size of cards 8¼" x 5½".



FORM 2019 SOM 4-19

SERVICE WORK ORDER (2)

Job No. 724 Date 1-2-20

Name John Doe

Address 12 Vine St. Lancaster Pa.

Chassis 43611 Model 5

Time to be Delivered 1-5-20

Work Ordered	Price
Repair ignition system and transmission	
1 new spark plug	
1 " front hub	
Total	12.40

CAR SHEET
NO CARS DELIVERED WITHOUT THIS ORDER
All Repairs Cash on Delivery of Truck

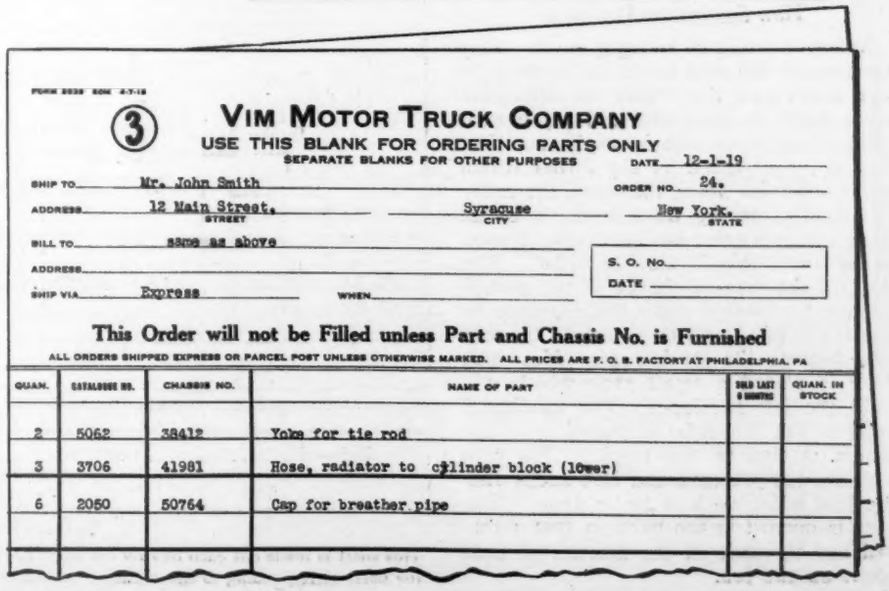
Above Work and Material Ordered by

SIGNED Jno. Doe

Not Responsible for Damage, Fire or anything Left in Car

TO BE RETAINED BY OWNER

Below: Factory Parts Order Form When the dealer needs more parts he uses this blank. The parts used each week are checked up on this blank. Size 8½" x 11".



FORM 2023 SOM 2-7-18

(3)

VIM MOTOR TRUCK COMPANY

USE THIS BLANK FOR ORDERING PARTS ONLY
SEPARATE BLANKS FOR OTHER PURPOSES

DATE 12-1-19

SHIP TO Mr. John Smith ORDER NO. 24.

ADDRESS 12 Main Street, (STREET) Syracuse (CITY) New York. (STATE)

BILL TO same as above

ADDRESS

SHIP VIA Express WHEN

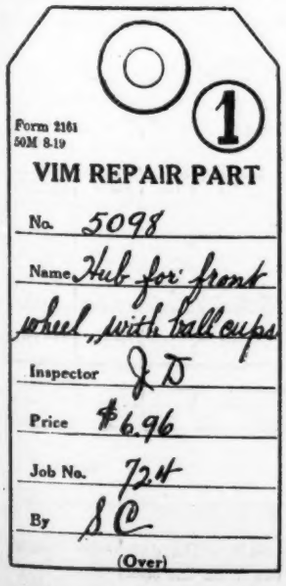
S. O. No.

DATE

This Order will not be Filled unless Part and Chassis No. is Furnished

ALL ORDERS SHIPPED EXPRESS OR PARCEL POST UNLESS OTHERWISE MARKED. ALL PRICES ARE F. O. B. FACTORY AT PHILADELPHIA, PA

QUAN.	CATALOGUE NO.	CHASSIS NO.	NAME OF PART	SOLD LAST 6 MONTHS	QUAN. IN STOCK
2	5062	38412	Yoke for tie rod		
3	3706	41981	Hose, radiator to cylinder block (lower)		
6	2050	50764	Cap for breather pipe		



Form 2161
50M 8-19

(1)

VIM REPAIR PART

No. 5098

Name Hub for front wheel, with ball cups

Inspector JD

Price $6.96

Job No. 724

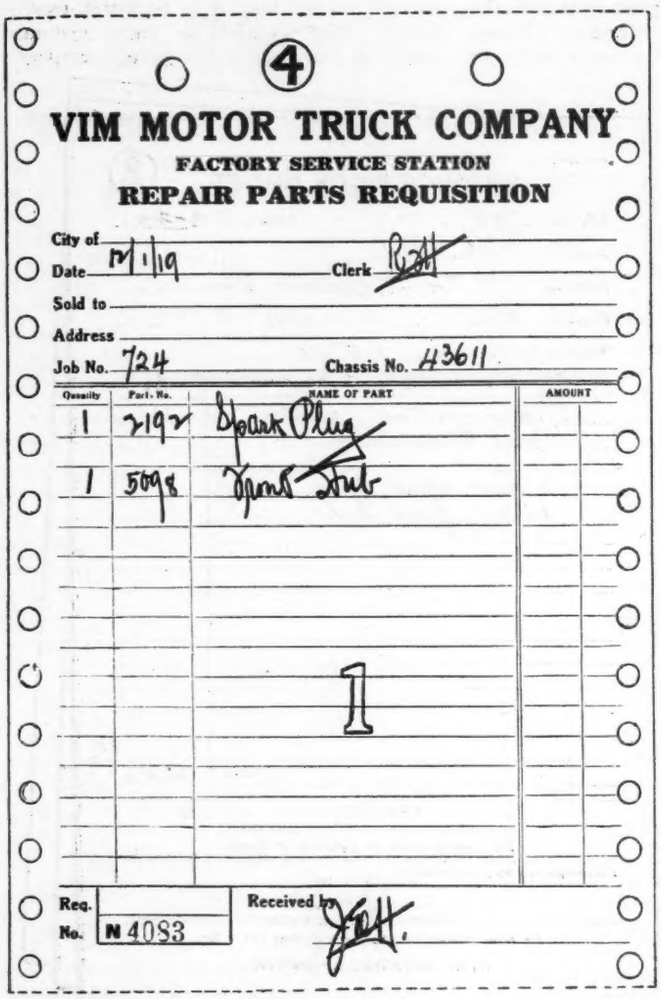
By SC

(Over)

Left: Tag Which is Placed on All Parts. Size of tag 3¾" x 1⅞".

ing a force of men, and which only requires the supervision of the garage owner or a working foreman, is as follows:

Each part in the stock room is tagged with a small tag (Fig. 1) which bears the manufacturer's part number, a brief description of the part and the price. In the case of small parts such as balls for ball bearings and small screws, these are kept in bags bearing one tag with the above information.



④

VIM MOTOR TRUCK COMPANY

FACTORY SERVICE STATION

REPAIR PARTS REQUISITION

City of

Date 11/19 Clerk

Sold to

Address

Job No. 724 Chassis No. 43611

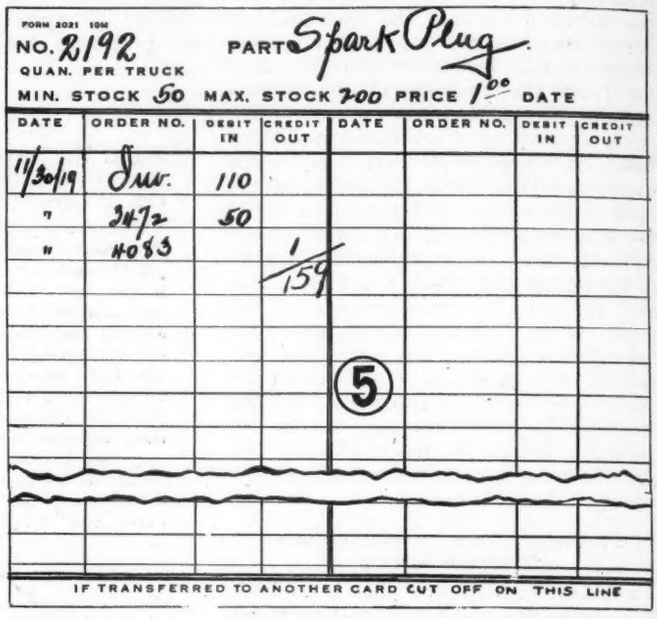
Quantity	Part. No.	NAME OF PART	AMOUNT
1	2192	Spark Plug	
1	5098	Spark Stud	

1

Req. No. N 4083 Received by

Above: Perpetual Inventory Card

These cards are kept in the office and not in the stockroom, to provide a check upon the storekeeper. Size, 8½" x 5".



FORM 2021 10M

NO. 2192 PART Spark Plug

QUAN. PER TRUCK

MIN. STOCK 50 MAX. STOCK 200 PRICE 1.00 DATE

DATE	ORDER NO.	DEBIT IN	CREDIT OUT	DATE	ORDER NO.	DEBIT IN	CREDIT OUT
11/30/19	Inv.	110					
"	3472	50					
"	4083		1/159				

⑤

IF TRANSFERRED TO ANOTHER CARD CUT OFF ON THIS LINE

Left: Requisition for Repair Parts

One copy is placed in the job envelope; the second goes to the office, and the third stays in the machine. Size, 8½" x 5¾".

bination with the numerical file of the job envelope furnishes a cross index which is easy to refer to. A simple set of books is opened having a small cash book and voucher book which can be kept by the owner or some member of his family evenings or through the day.

At the end of each week, all of the parts tags in the job envelope which have been completed, also in the jobs which are in process, are listed on a factory parts order (Fig. 3) and to this list is added any parts which may be needed which have not been in stock so that the stock is replenished automatically.

How the System Operates

When a truck is brought to the shop for repairs, the man in charge of the garage interviews the owner to determine what work is necessary and a job card (Fig. 2) is made out in triplicate. The first copy is signed by the owner which is his order for doing the work, the order specifically stating what work is to be done and if a price has been agreed upon in advance, this is also recorded. The desk of the man in charge of the garage should be located near the entrance to the stock room and **there should be only one door to the stock room.** Near this desk is placed a small rack which will hold the job envelopes. The cardboard copy of the job order is placed in a case which is tied to the truck. This case protects the job card and also keeps visible just what work is to be done. This case is opened in the back so that a record can be made of the amount of time spent on the job.

When parts are required they are taken from the stock room, the tag is removed from the part and the job number written on it and it is placed in the job envelope bearing the number of the job on which they are to be used. The old parts removed from the truck are thrown in a box inside the stock room. After the job has been completed and tested and is ready for delivery, the job card is removed from the truck. On the back of this card is a record of the time and together with the parts tags in the job envelope, all the information necessary is furnished to make out the bill. The bill is made out in triplicate either by hand with an indelible pencil, or preferably typewriter using carbon paper for the copies. One copy of this bill is also placed in the job envelope. This envelope is then filed away numerically. The second copy of the invoice is filed in a binder alphabetically under the owner's name. This file in com-

V. M. T. Co.—Pads of 100
Form No. 2236 5M—8-19

SERVICE PARTS INVENTORY

Service Station Jno. Smith Date Ordered 11-19

1 Part No	2 Date	Last No. used on 3 Cash Sale	4 Shipping Order	5 Job Req'n	6 Receiving Slip	7 Count	8 Card	9 Diff — Diff +	10 How Corrected	11 List	12 Amount	13 Three Mos. Requirem'ts
1236	11-19	25700	1262	41170	1010	3	3			$ .375	$ 1.125	25
1237						4	6	-2	Not Listed	.25	1.00	20

Approved Service Manager Signed Stock Clerk

Service Parts Inventory

This sheet is made out each day by the office clerk, with thirty numbers on it. The storekeeper counts the parts corresponding to the numbers on this sheet and writes the count on the sheet which is returned to the office for checking against the total on the inventory cards. Size of sheet, 8½"x11".

This system furnishes the necessary records with the least possible amount of clerical work or bookkeeping which is always distasteful and invariably avoided by a mechanical man.

How the Service Dealer Becomes a Sub-Dealer

An arrangement is made with these service dealers whereby if they can make the sale of a truck or even get a prospect up to the point where he can be closed by either a factory district salesman or the salesman of the nearest dealer, he gets a commission on the sale. After one or two of these sales have been put over, he is appointed a sub-dealer and his commission on both parts and trucks is increased. As his business increases his system and routine is expanded as follows:

A combination clerk and bookkeeper takes care of all office work and a stock man takes care of all the stock, tools and job records. The parts in the stock room are placed in standard bins, built as shown. They can be arranged in tiers and aisles according to the shape of the space available. Wheels, axles and springs are carried on separate racks, built especially for this purpose. A counter register is used to requisition parts from the stock room, either for sale to owners or other repairmen or for use on jobs in the shop. A time clock is located in the shop in a place readily accessible to all the workmen. The books are somewhat more elaborate than those previously described in that they have a journal, voucher book, sales ledger, cash book and trial balance book.

When a truck comes to the service station for repairs, the owner is interviewed by the foreman in the same manner as above described and the same job order is made out, the second copy of which is given to the storekeeper who makes out the job envelope and places it in the rack, which in this case is located inside the stock room near the window for handing out parts. A time card is also made out and placed in a rack near the time clock. The job card is placed in a holder which is strapped to the truck. When the foreman assigns a mechanic to work on the truck, he rings "on" the time card bearing the correct job number and when parts are required the job card holder is taken from the truck to the stock room and the storekeeper is told what parts are required and he makes out a requisition (Fig. 4) for the parts on the requisition machine which makes three copies. One copy is placed in the job envelope in the rack in the stock room, the second copy goes to the clerk in the office and the third copy stays in the machine. The requisition number is written on the back of the job card in the job holder which is a check to prevent requisitions being overlooked when the job is billed. If the mechanic is taken off his job for any other work, he rings "off" on the job card in the rack and "on" another job card so that his total time for the day will all be recorded on job cards in proportion to the time he spends on each job.

When the job is finished, the time card is taken from the clock rack and placed in the job envelope together with the requisitions. The foreman looks over the requisitions and the time card and approves the work. The envelope containing these requisitions and time cards is then delivered to the clerk in the office to make out a bill. One copy of the bill and also the original is then placed in the job envelope and the envelope returned to the stock room. When the man calls for the finished truck he is again met by the foreman, presented with the bill and the foreman has in his hands then, all details of the job and can intelligently answer any questions asked by the owner, as he will have all requisitions and the time of all the men and the details of the time. The money is collected by either the foreman or the clerk in the office. The requisitions which are placed in the office are the basis upon which the weekly parts order to the factory is made out.

The next expansion of the routine embraces a set of perpetual inventory cards

FORM 2057

CHASSIS NO. 56334	TYPE D-21	DATE SHIPPED 8-3-18	MOTOR NO. 20432
SHIPPING ORDER NO. 5562		DATE DELIVERED 8-28-18	INVOICE NO. C-2060
SHIPPED TO AGENT C. J. Kickney		OWNER A. S. Holmes	
ADDRESS Hamilton, Md.		ADDRESS Hamilton, Md.	
CHANGES AFTER DELIVERY		BUSINESS Grocer	

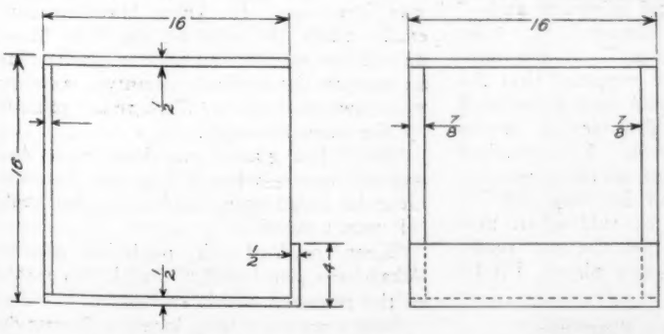
Mar. 3, 1919. Model D body changed for Model F
Apr. 6, 1919. Truck in wreck, new radiator and engine #66462 installed
May 4, 1919. Equipped with Battery Electric lighting.

Card for Keeping Record of All Trucks in Service

These cards indicate the territory where one or more trucks are in operation in towns or districts which are not readily accessible to an established dealer. Size of card 8 in. x 5 in.

Initial Stock List for Vim Half-Ton Truck

Quan.	Part No.	Name of Part
1	3300	Magneto
1	1524	Front Wheel less hub
1	5704	Rear Wheel less hub
1	3674	Front Spring 35½ in.
1	3678	Rear Spring 50 in.
3	2096	Cylinder head gaskets
2	2418	Connecting rod bearing (4-halves)
2	2002	Crankshaft bearing front (4-halves)
2	2006	Crankshaft bearing centre (4-halves)
2	2010	Crankshaft bearing rear (4-halves)
2	2422	Piston pin bushings
2	2436	Piston pins
1	5090	Ball cups—inner
1	5092	Ball cups—outer
1	5016	Cones adjusting L. H.
1	5014	Cones adjusting R. H.
2	3644	Spring bolts
1	2370	Fan filler cap
1	2368	Fan belt
2	3704	Hose for radiator—upper
1	3706	Hose for radiator—lower
10	2554	Oil gauge glasses
1	5560	Ring gear
1	5558	Pinion gear
1	4832	Prop. shaft assem. less slip joint
1	2432	Pistons (std)
6	2434	Piston rings (std)
1	5508	Bearing—rear pinion shaft—comp.
1	5512	Bearing—front pinion shaft—comp.
1	5608	Main shaft
1	2748	Clutch release brg.
2	2764	Clutch release brg. nuts
5	2860	Clutch equalizer bolts
3	5086	Rim bolts
3	5102	Rim lugs
3	5104	Rim nuts
2	2224	Valves
10	2164	Valve pins
22	2552	Gaskets for oil gauge
1	2050	Breather pipe caps



Boxes for Vim Standard Parts Are 16 in. Square

Facsimile of Date on Outside of Job Envelope

After the job is completed the envelope contains a complete record of the entire transaction. Size of envelope 9 in. x 6 in.

FORM 2010 COM. 7-10

Motor No. F-972 Job No. 724
Chassis No. 43611 Date 1-2-20.
Name John Doe
Address 120 Vim St. Lancaster, Pa.

This Job Envelope contains the following
WORK CARD
WORK SHEET
TIME CARDS
REQUISITIONS
COPY OF INVOICE

Invoice Date 1-5-20 10 29811 Ledger Page 10

TO BE FILED IN JOB ENVELOPE FILE UNDER OWNER'S NAME

(Fig. 5). These cards furnish a complete picture of the exact condition of the stock of parts and accessories. These inventory cards must be kept in the office and not in the stock room to provide a check upon the storekeeper. A complete inventory is taken each month by the storekeeper by a physical count every day of a pre-determined number of parts numbers according to the number of parts carried in stock. If there are 750 different parts carried, this quantity is divided by the number or working days (25) in a month, which would be 30 numbers per day. The clerk in the office selects 30 numbers from the inventory cards and writes them on a sheet, which sheet is given to the storekeeper. The storekeeper by a physical count inventories the parts bearing these numbers and writes the count on the sheet which is returned to the office, the count being checked against the total on the inventory cards and if there are any discrepancies, investigation is made and the necessary corrections made. This count is facilitated by carrying all small parts.

The Leather Tag, With Celluloid Cover, Which Protects the "Service Work Order"

such as balls, copper pins, nuts and screws in bags. Each bag contains a standard quantity such as 10, 50 or 100, depending upon the size of the part. Every bag has a tag with a number and the contents, and only one package is kept open at a time.

In preparing these forms and a practical routine to be followed in repairing trucks, the Vim Motor Truck Co. is providing a service which is available to dealers who have not had the experience in such matters and are, therefore, not in a position to provide themselves with necessary records to protect them against loss, due to inefficient business methods.

All of this work is under the direction of the director of service at the factory of the Vim Motor Truck Co., who is in a position to provide especially trained men to assist the dealers in their mechanical, accounting or executive departments. All of this expense is borne by the factory and is justified by the results shown in the reduction of sales resistance by increasing the efficiency of the dealer's service.

Tommy, the Dealer, Proceeds to Create Both His Sales and Service Organization

Tommy Williams, Appreciating the Importance of Local Friendship, Establishes Himself. He Also Converts Agency Into a Well-Lighted Salesroom

By C. P. SHATTUCK*

OVER a month had elapsed since Tommy Williams, star salesman of the Pawtucket Motor Truck Company, had left the employ of the company to start in business for himself up-state selling the Providence line of trucks. J. G. Wilkins, head of the Pawtucket company, had not seen Tommy since the day of the farewell party, when the employees of the company presented Tommy with a Pawtucket six sedan. J. G. had heard from Tommy, however, a few days before Christmas. Tommy had sent a Christmas remembrance in the shape of a box of fine cigars and the customary greetings of the season. Of course, J. G. remembered his ex-salesman, as he did all of his employees. Christmas was the one big day of the year with J. G. and his personal check plus that of the company's, a bonus or profit sharing, was his method of playing Santa Claus.

J. G. Hears Some News

Not until after New Year with the annual stock taking did J. G. recall his promise to himself that he would keep an eye on Tommy's progress, and after he had cleaned up the morning's mail, he rang for Miss Brown, his secretary.

"Heard anything from Tommy, Miss Brown?"

"He was in last week and had the carburetor tuned up on his car," was the reply. "Mr. Smith said that Tommy told him that he was quite busy getting his salesroom, offices and service station laid out. He has leased a one-story brick building and is having alterations made. Was in a hurry and outside of saying hello to us did not tarry long. Cal Emmett, who travels for Yearrich tires, told me Tommy is going to have a swell place, that he is spending lots of money. Cal also said that Tommy is hiring mechanics, office help and salesmen and—"

"He is, is he?" exclaimed J. G. "Get him on the phone for me." A few minutes later Miss Brown reported that the telephone company had not completed installation at the Providence Motor Truck Company's station. J. G. reached for his time tables, but as there was no train until after lunch he rang for his chauffeur. "Jimmy," he said when that individual appeared," get the car ready for a run up to Tommy's place. I'll be ready in 30 minutes."

Jimmy Picks Up a Passenger

Ensconsed in the limousine with a big black cigar J. G. ran over in his mind the conversation he had with Tommy the day of the farewell party. "No business to neglect that boy," thought J. G. "The Lord knows what he may do." About this time the car stopped and J. G. got a view of Jimmy wending his way into the depot. "Now what does this mean?' remarked J. G. "That boy is getting too confounded presumptious doing as he pleases," but when a few minutes later Jimmy appeared lugging a grip and accompanied by Del Hawkins, sales manager of the Pawtucket factory, J. G. forgot his wrath, opened the door of the car and gave Del a hearty greeting, " Am on my way up to see Tommy," remarked J. G. "Better run up with me, Del," to which the latter acquiesced. Jimmy's breach of discipline was forgotten. He knew Hawkins generally made the city on the first Monday of the month and took a chance that he was on the limited. Jimmy's memory was rewarded by a "Christmas" present by the sales manager.

"Del," I'm glad I run into you. Am worried about what I hear of Tommy. Hear he is splurging and I fear his bank roll won't stand it."

"Keep cool, J. G., probably gossip. What have you heard?" and J. G. repeated the remarks of his secretary.

Jimmy was not long locating Tommy's place after reaching the town. The building was, as Miss Brown stated, a one-story brick structure on one of the main streets, a corner location. The building was about 75 ft. wide in the front and 100 ft. deep, and directly in back of it was a vacant lot of similar dimensions. "Hope Tommy has an option on that

*This is the second of a series of articles by Mr. Shattuck dealing with problems of the new truck dealer. The third will appear in an early issue.

lot, J. G.," remarked Del Hawkins. "It will come in handy if Tommy makes a go."

Tommy Makes Many Friends

"Of course he's going to make a go of it, Del. Don't be so pessimistic. Wonder where Tommy is?" The question was answered by that young man making his appearance and shaking hands with J. G. and his companion. After the greetings were over Tommy invited his guests inside, where workmen were busy erecting partitions, laying a concrete floor, installing wiring, etc. J. G. browsed around the place with Tommy tagging at his heels explaining his ideas as to the proper layout of a station. The cessation of activities by the workmen at noon reminded Tommy of his duties as host and soon the party was seated at a table in a hotel. J. G. noticed that for the short time Tommy had been in the town he appeared to have made a large number of acquaintances and this pleased J. G.

After the dessert had been disposed of and cigars lighted Tommy precipitated matters by asking J. G. what he thought of the station and show room. "Looks all right, Tommy," replied J. G., "but how much rent are you paying and how far are you going with the alterations? And what's this I hear about you engaging mechanics, office help, salesmen, etc.? How far have you committed yourself?"

"Oh, wait a minute, J. G.," interrupted the sales manager of the Pawtucket factory. Let Tommy give us an outline of his plans before you jump on him. I never was sold on snap judgment anyhow. Now the policy of the Pawtucket factory is to—" "Policy! policy!" snorted J. G. "Why the policy of your company has the three card monte game beaten to a frazzle. Why let me tell you something about your policies—" but Tommy interrupted, knowing that if J. G. and Hawkins locked horns, the fur would fly. "As you advised me, Mr. Hawkins," said he, "to go slow, I have done so. Now, my rent on a lease basis with privilege of buying is $150 the month and I also have an option on that vacant lot. As to alterations, here are the figures of the contractors," and Tommy laid them before J. G. who after an inspection grunted his approval.

Changes Over the Salesroom

"The only change I have made to the front of the store," continued Tommy, "was to install full size windows on both sides so as to secure a well-lighted show room by daytime and to display my trucks to an advantage. If you will note the diagram (and Tommy laid down a sketch) you will see I have but one entrance to the show room from the street. Trucks are shunted to the room by a double door. The room being 30 x 75 will enable me to show several trucks and to doll the room up."

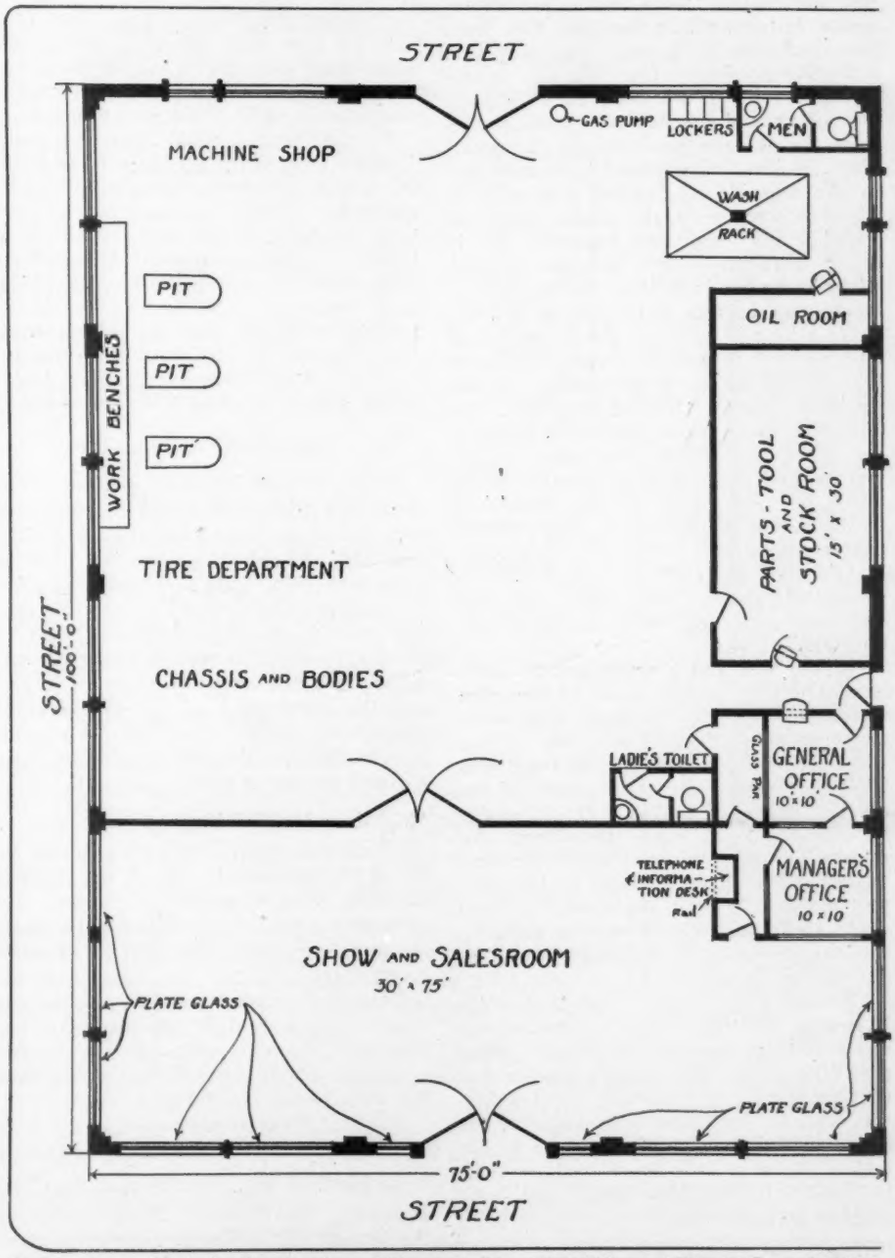
"What do you mean, doll it up?" interrupted Del Hawkins. "Something new? Better be careful of too advanced ideas in these small places, Tommy."

"We'll pass it up for the present," replied Tommy, "but when I get it all dolled up I will send you a photo or two, Mr. Hawkins." Tommy went on to explain the arrangement of his office, the general office, service station, parts and stock room, etc., answering questions of the older men and making notes of their suggestions. J. G., who had been poring over the plans and noting "Free Air" and a tire department sketched in commented on same.

Catering to Passenger Car Owners

"I intend to put on a tire department just as soon as I can see my way clear," explained Tommy. "I expect to sell the greater number of Providence trucks in and around here equipped with the big pneumatics and do not propose to have users of Providence trucks serviced by the local tire man. I aim to install a tire changing machine, tire press, vulcanizing equipment, etc., and to carry the big shoes. Also advertise the fact that there is free air for all in front of my station, passenger car as well as truck owners."

"Why cater to the passenger car owners, Tommy?" asked Del Hawkins. "Because," came the instant reply, "my future prospects around here own them and anything I can do to bring them to my place means truck sales. I'm going to write every owner a personal letter inviting him to make use of the air and the service of my tire department. I'll handle passenger car tires, too. Why not? Did it ever occur to you, Mr. Hawkins, that the truck dealer in the small agricultural centers is going to be the one to sell the farmer his automotive equipment and that in order to sell him the dealer must primarily secure the confidence of the farmer? And do you know, Mr. Hawkins, that there isn't a finer bunch of prospects to deal with than the



Layout Shows How the Renovation of Tommy's New Establishment Effects Co-ordination Between the Sales and Service Departments

Every detail that would lend itself to a more attractive showroom and an up-to-date service department was given thorough consideration

farmer? Why dog bite it, when you get acquainted with the farmer and compare him with the average truck prospect in the city, why,—there isn't any comparison at all."

"Something in it, Del," remarked J. G. "I think we have been passing up a good bet. Tommy is right. But what about your sales force, office help, etc.? We understand you have started an organization."

"A small one," replied Tommy. "Just two at present, but both are on the job. My staff consists of a mechanic or service manager and a salesman. Later when I get started I will have an office or telephone girl and a bookkeeper.

"Where and what's the two doing now," said J. G. "I did not see them."

Factory Training for Mechanic

"They are on the job, just the same," was the reply. "Both are at the Providence factory. You see, it's this way. Jimmy Myers is a local mechanic and a mighty good one, too. He can handle a lathe, milling machine, etc.; in fact, has all around mechanical experience as does the average mechanic in the small place. I hired Jimmy and have sent him to the Providence factory, where he is learning how they make trucks, put them together and keep them together. He is going through every department and when he comes back here will be able to locate and correct a trouble in a jiffy. Besides he will have all the factory stuff on special tools and equipment. I figure that it will be good advertising to say we have a factory-trained mechanic. In fact, the local paper ran something to the effect that Myers was going to the factory and there will be another story when he gets back on the wonderful methods, big plant, service, etc. Rather neat copy, what?"

"Old stuff, old stuff, Tommy," remarked Del Hawkins. "We used to do that years and years ago in the passenger car business."

"Maybe old, but it's still good," came back Tommy. "How many of the birds handling truck repairs these days know anything about factory methods of disassembly and assembly. Mighty few. They get experience at the cost of the owner. None of the cold chisel, sledge hammer and hacksaw repairmen for mine. The farmer won't stand for anything but the square deal and he isn't getting a square deal if the repairs are not made right and without undue expense. Besides the cost of keeping Jimmy at the factory is small."

"Tommy's right, Del," said J. G. "He is getting the right slant on the service angle and it's keeping the trucks going that sells them. I shouldn't wonder but that some of my repairmen need a factory course, but what in thunder is the salesman doing at the factory. You are taking a chance that those birds will fill his head full of foolish ideas," and J. G. grinned at Hawkins.

Picks Country Lad for Salesman

"Why," replied Tommy, "I sent Billy Stebbins out to get an insight of how the Providence trucks are built, of the organization behind them. He's a mechanical sort of a chap and bright as a dollar."

"Ever had any experience selling?" broke in J. G.

"No, can't say as he has. But he is a local boy and comes of an old time family hereabouts. Knows every farmer, his wife, children and all. Knows farming, too. Regular encyclopedia as to the natives, their habits and I dare say knows to a penny how much each is worth. Billy will know how to drive a truck and talk truck when he gets back. If he serves no other useful purpose he should be able to dig out prospects for yours truly to close. I propose to teach him salesmanship."

"Hum," remarked J. G., "how are you paying him? Commission and drawing account or salary?"

"Going to pay him a salary and a commission."

"Wrong dope," interrupted Del Hawkins. "You can't afford to in the first place and secondly it won't work out. The only way to put them over is the commission plan. How about it, J. G.?"

Before J. G. could frame a reply Tommy begged for a chance to be heard. He was analyzing the weak points of the commission plan, pointing out how it bred trouble, law suits, etc., when Jimmy burst into the room with his usual disregard for all present. "Say, Mr. Hawkins, if you expect to get the 5.05 limited tonight you will have to wiggle some. But I guess the old Pawtucket six can make it if you hurry." Jimmy had a subtle way of evading overtime work.

Tommy Analyzes the Gift

As J. G. and Hawkins got into their coats and were saying goodbye to Tommy that young man handed J. G. a letter and said, "Look the contents over on your way back." J. G. accepted the letter and promising later to look Tommy up entered the limousine after warning Jimmy to drive carefully which instructions Jimmy of course disregarded. Opening the envelope J. G. found therein a check and a letter. The former was made payable to the Pawtucket Motor Truck Co. and the latter read as follows:

"My dear Mr. Wilkins:

"Enclosed please find check drawn by K. E. Witherspoon, one of our leading farmers, for a Pawtucket six sedan. He stipulates it shall be equipped in the same manner as mine; in fact, identical throughout.

"You will recall I failed to analyze the why of the gift of the car to me at my leaving. The enclosed order is my analyzation. With best wishes and thanks for your many courtesies, I am,

"Very truly yours,

"Thomas Z. Williams."

"What's the idea, J. G.?" remarked Del Hawkins. In silence J. G. passed over the letter and the check. The sales manager of the Pawtucket factory read the letter and after glancing at J. G. remained silent. There are times when silence is golden and this was one of them.

A Good Stunt in Taking Care of Correspondence

Nearly every correspondent has experienced the annoyance of receiving a letter in answer to an inquiry which does not contain a reference to the original and the file clerk reports that a copy of the original cannot be located, causing considerable loss of time in getting action or completing records. The Vim Motor Truck Co., of Philadelphia, has overcome this difficulty and incidentally made a saving in paper for branches and dealers by the use of an "Important" sheet. This sheet is regulation letter head size.

When an inquiry is sent to a branch or dealer, it is written upon a standard factory letter head with a carbon copy upon the "Important" sheet in addition to the regular carbon copy for the file. When this letter is received by the branch or dealer the answer is written upon the back of the "Important" sheet and the carbon copy of this answer is written upon the back of the original. The branch or dealer files the original letter which has the answer on the back and therefore, cannot be separated from it, and returns the "Important" sheet to the factory which goes directly to the person who sent the inquiry, as the "Important" sheet bears his name. With the inquiry on one side and the answer on the reverse side it is unnecessary to refer to the file for the original inquiry. Many mistakes are avoided and there is a considerable saving in time at the factory and paper by the branch or dealer, as they furnish absolutely no paper, either letterhead or carbon copy in this transaction.

Trade Literature

Burd High Compression Ring Co. has just published a 112 page directory of Burd High Compression Piston Rings. Over 600 sizes and oversizes of rings are given, as well as piston ring specifications for more than 1500 models of automobiles. It likewise contains complete instructions for the installing of the rings and much useful information concerning oversizes, etc. A copy of this booklet may be had by any garage or repair shop, upon application to the Burd High Compression Ring Co., Rockford, Ill.

Columbia Mfg. Co., Belleville, Ill., has issued a pamphlet which describes Crescent grinders and buffers, countershafts and presses for heavy auto trade. It is known as **Grinder Book No. 26.** A copy will be mailed to anyone applying for it.

Republic Motor Truck Co., Inc., Alma, Mich., recently issued a catalogue on truck body design. It shows a diversified line of standard body equipment and explains in detail the most approved methods of mounting bodies on Republic chassis. The catalogue is well illustrated and contains many detailed descriptions.

The motor truck on the farm will be discussed in leading articles in in our next issue.

Should Driveways of Filling Stations be Covered?*

PROBABLY nothing has provoked more discussion among filling station men than the question as to whether or not driveways should be covered. Practically every one, when first approached on this question, replies in the affirmative.

Let us carefully analyze the problem from all angles.

The first station ever constructed had driveways covered. Some companies who have been building a large number of stations every year now are building practically all of their stations without covered driveways.

If two driveways on the same side of the building are to be covered it is necessary to add approximately 40 per cent. to the cost; to cover a single driveway add approximately 25 per cent. If more than two driveways are covered, the cost is increased still more.

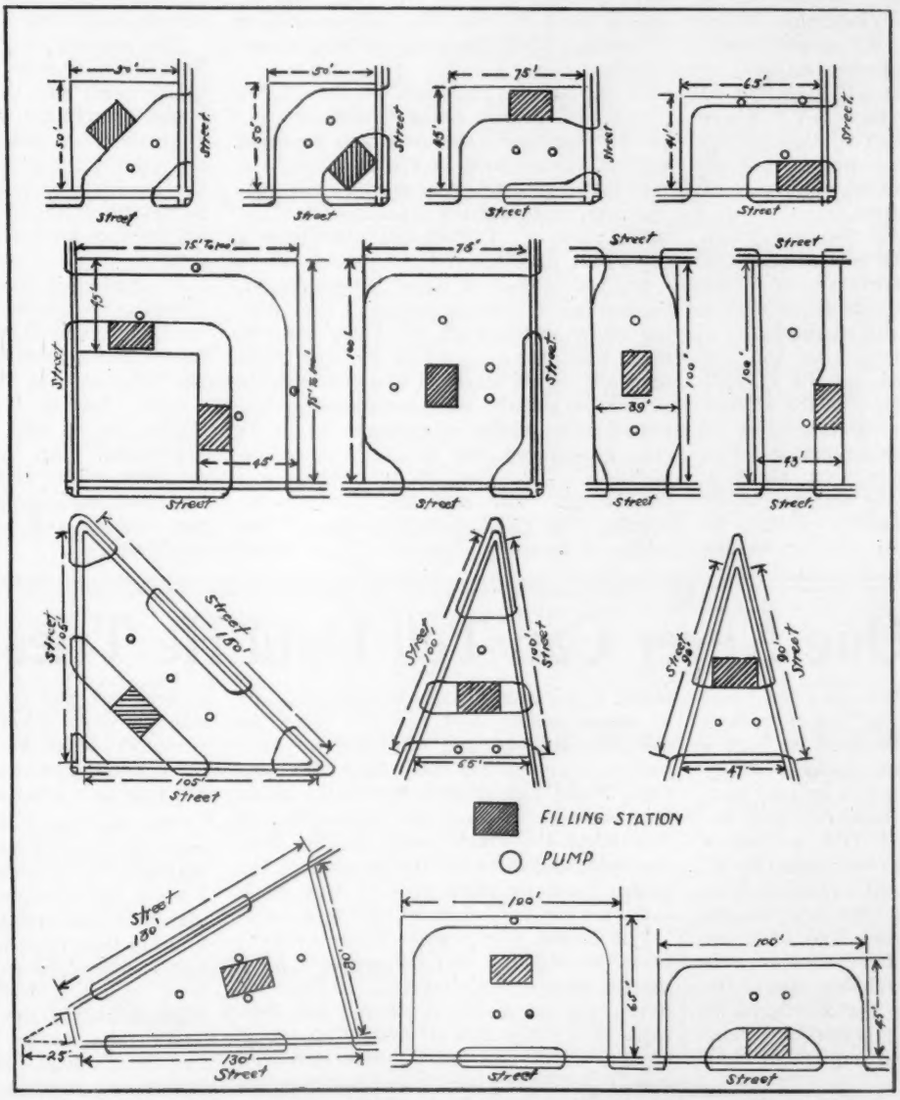
There is very little argument concerning the statement that more cars can be efficiently served in the same length of time on the same sized property where the driveways are not covered than where they are. The supports of the cover naturally limit or cut down the driving area, thereby tending towards congestion always means poor and slow service.

The principal reason for covering the driveways is to protect the patron who wishes to get out of his car during the filling operation. Statistics kept at one station having covered driveways, doing a large gallonage, revealed the fact that less than 8 per cent. of the customers actually left their cars.

In view of the foregoing, even taking into account the fact that the covered driveway is most useful in stormy weather, at which time this class of business is at its lowest, it would seem that it was a waste, not only in the cost of construction and maintenance, but in efficient operation as well.

If it is decided to cover the drives for any special reasons, the following rules should be borne carefully in mind.

The clearance, from the drive to the lowest part of the cover under which a car has to pass, should not be less than ten and a half feet and should be twelve feet if there is any probability of a truck using the drive. Do not have center supports. Construct the roof in such a manner that it will not sag from its own weight or from snow and ice.



Typical Ground Layouts for Drive-in Filling Stations, Showing Minimum Size of Lots to Which They Are Applicable

All driveways as shown are thirteen feet wide for single drives and twenty-five feet for double drives. Buildings are thirteen by nineteen feet, without roof over driveways and pump islands are three feet wide.

Location and Kind of Driveways

The location of a driveway is naturally governed by the location of the building, and must conform to local conditions. Typical driveway layouts are shown in the accompanying sketch. Driveways, located under cover, should not be less than thirteen feet in width. Those in the open can be 12 ft. wide for one way driving and at least 25 ft. for two way driving.

The approach at the curb is a very important feature and should not, under any circumstances, be less than twenty-five feet for approaches which are used only for entrance or exit. If used for both entrance and exit they should be thirty-five feet wide. Two companies are now widening their approaches to fifty feet wherever possible.

Do not have any abrupt changes of grade in the approach. The writer knows of one station that lost about fifty per cent. of its business on account of a two-inch drop at the curb, which was the cause of several broken springs, dished wheels and bent axles. Avoid sharp turns particularly when close to a covered driveway. Many of the better stations now have a concrete curb about four inches high and 2½ in. thick on both sides of the driveways.

The only two classes of pavement for driveways are a true water-bound macadam and concrete with a smooth cement finish.

The entire station is being designed and built primarily for the sale of gasoline and lubricating oils, therefore the type and location of equipment to be used for the storage and dispensing of these commodities are the most important and vital problem that we have to consider.

Pumps and Tanks

Let us first consider the storage tanks. All tanks should be built of open hearth steel plate. When galvanized they should be of not less than twelve gauge. Tanks

*(This is the third of a series of articles written by F. A. Bean, Consulting Engineer, Wayne Oil Tank & Pump Co., on the planning, arrangement, equipment and management of filling stations.)

Service and Repair Departments Continued on Page 108

Activities of the Motor Truck Association of Philadelphia

OFFICERS

E. J. BERLET, President
J. P. CRANSTON, Vice President
W. R. WALTON, Treasurer
W. H. METCALF, Sec'y, 328 N. Broad Street

BOARD OF GOVERNORS

T. K. QUIRK, F. A. KISSEL, E. P. GAUL, W. Y. ANTHONY

THE COMMERCIAL CAR JOURNAL OFFICIAL ORGAN

According to the annual reports of committees presented at its monthly meeting, Wednesday, January 28, at the Hotel Adelphia, last year was the most successful in the history of the Motor Truck Association of Philadelphia, which has just entered upon its seventh year. The membership has grown to 328, of which 87 are proprietary, 137 associate, 90 owner, 8 press and 6 honorary. There were 115 new members of all classes added during the year, according to the report of F. P. Henderson, chairman of the membership committee.

The financial status of the association was also reported to be in exceptionally good shape by the treasurer, W. Ross Walton, who reported that there was a balance of $2046.20 in the treasury.

W. H. Metcalf, secretary for the last six years and re-elected for the current year, stated in this report that the attendance last year had been the largest in its history, averaging 157 per meeting. The receipts from all sources were $2468.50. He also reported that the secretary's office had sent out numerous notices to members on matters of interest to the motor truck industry. The secretary stated that his office has compiled valuable information for the use of the members, such as a record of parts for trucks not represented in the city, etc. His office is used by traveling representatives of motor truck factories seeking information.

E. J. Berlet, chairman of the Motor Truck Association Show Committee, reported that the recent show was the most successful ever held in Philadelphia.

O. W. Doolittle, chairman of the special committee and the association's counsel, Arthur E. I. Jackson, submitted a report on details.

On the subject of Good Roads, W. A. Sutherland, chairman, reported that during the year the State Highway Department had placed contracts for 608 miles of roads in the state, of which 254 miles of durable surface were completed, in addition to 41 miles of concrete base. It also re-surfaced 307 miles of macadam highway. The cost of this work was $15,250,233. The contracts for the incoming year call for the awarding of 800 miles of durable highway. The report states that the condition of streets in Philadelphia had remained virtually unchanged for the last four years, although the present administration estimates that $20,000,000 should be spent on the city streets in the next four years.

The meeting was presided over for the first half by retiring President Thomas K. Quirk, who was presented with a handsome stickpin by former President John D. Howley on behalf of the members of the association. Mr. Quirk in turn, for the association, presented a $500 bill to Secretary Metcalf, as an appreciation of his services for the last six years without salary.

A characteristically interesting entertainment was provided by R. Arthur Bittong, chairman of the entertainment committee, and patriotic addresses were made by Judge Albert W. Johnson, of Union County; former Congressman J. Washington Logue, and by E. J. Cattell, City Statisician. Mr. Bittong concluded the meeting with one of his humorous speeches, reviewing the proceedings of the meeting and sparing none with his sparkling wit.

One Never Can Tell Until He Tries

IF, as the saying goes, "a faint heart never won a fair lady," surely a faint heart never sold trucks. In fact, a faint heart has kept many a dealer who would have made a success handling them out of the business—just because he was afraid to take a chance.

Two years ago, or thereabouts, F. W. Williams, president of the Williams Mfg. Co., Macon, Ga., came very near having a faint heart, and if such had been the case, this story would have been entirely different, and instead of being one of the largest truck dealers in the South, as he is today, he undoubtedly would have continued in the wagon and implement business.

"One day, some two years ago," said Mr. Williams, "the representative of one of the large truck manufacturers came into our store and started to talk trucks. I believed that there was a future for trucks in this country, but I was afraid to even buy one. 'How many trucks,' I asked the salesman, 'would we have to sell in order to hold the contract for another year?' 'If you will sell twelve trucks,' he replied, 'you can have the contract renewed.' So we agreed to take the twelve trucks during the year, and even after I had signed the contract, I was afraid we were stuck."

"As soon as we received our first shipment, I personally took hold of the sale of those trucks, and the first year we sold one hundred and fifty, and we have sold as many so far this year. The first thing I did was to take the truck out to my business friends and demonstrated just what the truck would do in their business, and after we had several of the larger concerns using them, it was much easier to get the other fellows interested.

"Of course, one of the reasons we have been successful is that we are in a position to give prompt service. In fact, we have built our business around that feature. We carry at least $25,000 worth of repair parts, and with three hundred trucks to look after, it means that we keep our stock up in good shape.

"In selling trucks, I find that it is just as necessary to discuss the bad features as it is the good. It gives a man confidence in you, for any sane man knows that there must be a 'nigger in the woodpile' in the truck business just as well as there is in the use of other machinery, and if you are frank to tell him what he may expect, he gives you credit for being honest, and that goes a long ways in this country, just as it does in other sections.

"There is no use in selling a man a ton and one-half truck to do a two-ton job. It may do the work all right for a short time, but sooner or later it is going to give out, and then it will cast a reflection on you. First I find out from the customer what he expects to do with the truck and then I will sell him the size job that will meet his requirements.

"He may think the price is too high, but I find that if you stick to your price that you know is right, you will sell him. I am a great believer in that, and I had that principle brought home to me more forcibly than ever, just the other day. We had a second-hand automobile valued at $700, and the dealer who handles that make came to me and asked what we would take for it. I told him he could have it for $600. He looked it over and said he would give just $150 for it. We talked and he kept quoting $150 so many times, that finally I told him to take it. He just stood pat on that figure until we let him have it. I suppose if I had kept saying $600 enough times, he would have paid that.

Mr. Williams believes that the truck is eventually going to be of considerable influence in cutting down freight rates. He said that last fall it was daily demonstrated that the trucks in that part of the country can carry local freight cheaper than the railroads, and that most of the cotton was hauled to Macon with trucks.

EDITORIALS

Are the Railroads at Last Recognizing the Truck?

TO those who have made a study of transportation problems it has been something of a conundrum why railroads and interurban lines have not made more use of motor-driven vehicles. Perhaps, the railroad viewpoint has been warped on account of continually looking upon the motor truck as a competitor, thus overlooking its wonderful possibilities as an adjunct to any rail system.

It is the logical railroad feeder; it is the railroad's ally, carrying goods economically and at speed not only between intercity stations, preventing congestion at the platform, but assisting in handling all less than carload lots to be moved short distances.

As a feeder, with the possibilities of operating over the entire network of roads leading to the railroad terminals and freight houses, its value can not be over-estimated. Here is a hauling unit which, taken collectively, can transport as much freight as the combined railroad systems of the country, yet comparatively few motor trucks, up to very recently, have been owned and operated by railroad management.

We are now finding instances of interurban lines, of electric railways, etc., installing not only trucks, but trucks with trailers, and the road train or series of trailers is only a matter of time. In other words, one of the largest potential users of trucks and trailers has at last awakened to its possibilities. In the near future it will in all probability cease to be looked upon by the railroad as a competitor and be accorded its rightful place as the greatest ally the railroad has at its command.

Proper Sized Chassis Required for Motor Bus

WITH the advent of the motor bus, quite a few truck manufacturers are now furnishing complete units. Some are disregarding the fact, however, that the particular chassis which they are recommending is not at all suitable for the bus body mounted upon it. At the recent shows quite a few bus bodies were exhibited, and in a number of cases it was noted that the chassis utilized was too light for the capacity body employed. Any chassis that is rated at one ton or less cannot be expected to carry a twenty-passenger bus job, especially if one stops to figure the weight of the passengers alone. If one figures the total weight of such jobs carefully, it will be found that the chassis is considerably overloaded even with only the actual seating capacity of the bus. Some manufacturers believe that all they have to do is to stick on a bus body on a light weight chassis and then they will have a real bus job. Such, however, is not the case. There is probably no highway apparatus which is subject to such variation in load as is the motor bus. And overloading is persistently practiced by motor bus operators during the rush hours, it always being the case for "room for just one more."

The result is that the motor bus operator finds himself money out of the pocket in a short time, due to the excessive wear and tear placed on the tires and the truck mechanism in general. The motor bus is subject to as much, if not more, wear and tear and hard usage as any other motor truck job and should be given special attention as far as spring suspension is concerned and the capacity of chassis employed.

The motor bus field will undoubtedly become a very interesting one for the dealer, but he should certainly not attempt to sell any motor bus job unless the outfit is substantially built, and of proper chassis capacity. Top heavy motor bus jobs must be avoided, as the undersized chassis will cost more to operate eventually than a heavier one.

Oversold *vs.* Business Insurance

IN looking over the motor truck industry as a whole, one is impressed with the oversold condition and the optimistic feeling which is prevalent in most truck factories. At the motor truck shows nearly every one interviewed, as to what they thought about the future of the industry, had nothing to complain about. "We have enough orders to keep us busy for the next year or two," or "we can't build them fast enough," were typical replies. It is a fact that the industry is today in a better and more healthy financial condition than it has ever been and those who are keeping in close touch with the industry are looking forward to many prosperous years. The same condition also holds true with the parts maker.

There are, of course, some concerns which within the next year or two will be out of the business, but this is not the fault of the industry, but simply the fault of such concerns who have, in most instances, entered the truck business with the idea of getting rich over night. There is no business which offers

greater opportunities than the motor truck field, either in the wholesale or retail end, provided legitimate business methods are employed.

Incidentally, however, there are certain concerns who, through earnest endeavor in the past, have built up an enviable business and have reached the point where they are practically oversold for some time to come. The result is that they believe it unnecessary to think about the future; that they might as well withdraw from the public's attention; that they might as well stop advertising; that they have so much business on hand that they can well afford to do so. Such concerns have our deepest sympathy. In these modern times we cannot conceive of any concern so independent that they can see fit to stop advertising just because they have more business on hand than they can take care of at present. Such concerns fail to realize that the day will arrive when the supply will catch up with the demand, so that selling trucks and truck equipment will become a more competitive proposition than it is now.

In an editorial published in these columns some months ago we stated that the British Government paid for the advertising of certain motor car and truck companies, who at that time were doing war work exclusively, so that the prestige gained of those concerns would not be lost after the war was over. Is any better argument needed than this?

The manufacturer owes it to his dealer to keep his name prominently before the trade. The manufacturers' advertising keeps the dealers sold on his product. It is a form of business insurance that cannot be allowed to lapse.

Retail Service Managers of New York Meet

Automotive Service Association Holds Interesting Meeting. Elect a Great Many New Members. Dealers Endorse Association

NEW YORK CITY, Feb. 4.—At the semi-monthly meeting of the Automotive Service Association of New York held last night, Henry M. Holt, service manager of the Willys-Overland Co., of New York, read a paper on "Routing a Job Through the Service Station." Although it dealt with passenger car service the paper contained many features of interest to the truck service managers, a number of whom were present. Mr. Holt described the methods of handling the work from the time the customer arrived at the station and he emphasized the necessity of prompt and courteous attention to the client.

Direct Contact With Customer

One of the advantages of the system is the service receiving man who also has charge of the testers. This man has a direct contact with the customer which proves invaluable, said the speaker. The method employed at the station is a flat rate or estimate which is based on different work and on thousands of operations of a similar nature.

Mr. Holt pointed out the need of the office or platform of the superintendent of the shop be so located that it command a view of each car entering and leaving as well of the repair shop proper. Among other suggestions of value to the members was the use of a route board. This board is similar to the production board used in the factories and is divided into the days of the week, etc. There is a two-piece route card, one section of which is attached to the job and the other placed on the board indicating the day the job is promised. This enables the men in charge of production to note each morning what jobs are promised and to see that they are delivered on time.

Defined Testing Route

Another method employed by Mr. Holt is the use of a definite test route. Cars sent out go over a certain route which is an advantage in that it enables quick location of a tester with a car. The system includes what is termed a courtesy call. After the work has been delivered to the customer he is called after a certain time has elapsed and asked how his car is running, etc. The various forms employed were displayed by Mr. Holt and explained. At the close of the address the members asked questions and various points were discussed.

One of the members announced that the Federal Employment Bureau had a number of soldiers who were incapacitated from performing their regular vocations but were able to do certain automobile work. The bureau asked that these men be given an opportunity to work in the service stations to learn the trade and that the bureau would pay their expense and salaries. Their time is not to cost the service station any money. The members of the association are to co-operate with the bureau.

Elect Officers for 1920

The election of officers for the ensuing year resulted as follows: President, Ralph C. Rognon, Brockway Motor Truck Co.; vice-presidentt, John Wilson Watts, Reo Motor Car Co.; treasurer, Ernest V. Derks, Buick Motor Co. Board of directors for two years: J. H. Lange, Three Point Truck Co., and John M. Grant, White Co. Directors for one year: Henry M. Holt, Willys-Overland Co.; Frank J. Lowe, Bronx Auto Co.; Henry L. Ferris, Autocar Sales & Service Co. At the previous meeting twenty new members were added and of these nine were managers of truck service stations. It was voted to admit associate members these to include salesmen and those not directly in charge of service station departments, etc. A number of applications for new and associate members were received and favorably acted upon.

A number of excellent papers are to be read at the semi-monthly meetings and among the subjects of interest to the truck members are: Specializing Mechanics, Frank J. Lowe, Bronx Auto Co.; Claims and Adjustments, Col. Jim Florida, Packard Motor Car Co.; Classification and Development of Craftsmen, Ralph C. Rognon, Brockway Motor Truck Co.; Can the Apprenticeship System Be Revised?, J. H Lange, Three Point Truck Co.; Charting Your Bookkeeping, Henry L. Ferris, Autocar Sales & Service Co.

The membership of the association is increasing rapidly. The Dealers' Association of New York has practically endorsed the association and has offered the use of its rooms for meetings, etc. A committee of the association has met one from the dealers' and the outcome is that the two work in harmony and that the Automotive Association will not lose its identity. Recognition of the association by the dealers will be the means of making practically a 100 per cent. organization as some dealers have not sanctioned their service managers joining heretofore.

Trailer Association Chooses Officers

NEW YORK CITY, Jan. 15.—Short-haul and terminal transportation and other potent matters were discussed by C. W. Reid, of the Federal Highway Council, and R. A. Brannigan, of the National Automobile Chamber of Commerce, at the first annual meeting of the Trailer Manufacturers' Association of America, which was recently held at the new headquarters in the Grand Central Palace.

At this meeting the following officers were elected for the coming year: J. H. Fertig, president; H. C. Fruehauf, vice-president, and J. C. Endebrock, secretary-treasurer.

News of the Trade in Brief

Motor Transportation Endangered

The motor truck and bus have proven their efficiency with such disastrous results to the common carriers that destructive legislation is being enacted in a number of states to put an end to the use of the automobile and truck in its new capacity.

In California and Nevada restrictions are being aimed at the motor truck as a competitor of railroads. Laws have been passed by the legislatures declaring trucks common carriers when they are engaged in general hauling and requiring the truck operator to show whether the truck line is a necessity; whether it is a public convenience; whether the transportation facilities already in use are inadequate; whether the truck line will be a permanent concern; and whether it will maintain a set schedule of operation. These questions must be proven to the satisfaction of the state public utility commission. In Nevada a case now in court, a railroad, opposing the rights of a motor vehicle company to operate as a common carrier, stated as one of the main causes of its complaints that said company "operates a train service that promptly and adequately meets all the shipping contiguous to its lines of rail and that neither public convenience nor necessity is to be subserved in the continuance or establishment of competitive service." The railroad further complained: "Let the trucks run and we will have to quit running the railroad. We pay big taxes that the landholders would have to pay. If the railroad stops running it will mean the ruination of the country." Many such cases can be found in the various states if we care to look for them.

Surely the motor truck industry owes it to the public to safeguard its operation, so that as new ways and means are discovered for lessening the cost of living, for providing more rapid transportation, for developing our national proficiency to the utmost, by the use of the automobile, the public may profit thereby and not suffer for the selfish interests of those who would keep the American nation from its rightful inheritance.

1919 Exports Total $185,000,000

NEW YORK CITY, Jan. 20.—According to statistics, recently compiled by the National City Bank of New York, exports of automobiles and parts aggregated about $1,000,000,000 in the last twenty years, while those exported in 1919 were valued at $185,000,000, of which amount $35,000,000 was for commercial cars.

France has shown her appreciation of the American made commercial machine by purchasing 3600 of them during 1919 at an approximate valuation of $15,000,000. Great Britain seems to be manufacturing her own commercial cars since the conclusion of the war and imported only about $500,000 worth of American made trucks in 1919. Sixty countries and colonies took American trucks in 1918.

Since the year 1906, when records were first kept, the imports of automobiles into the United States have aggregated about $31,000,000. The high water mark was reached in 1910 when $3,837,000 worth of machines were imported, while during the year 1919 the imports were valued at only $524,709.

Coming Events

February 9 to 19, 1920—Nashville, Tenn. Automobile Show.

February 9 to 21, 1920—New Haven, Conn. (First week passenger cars). Second week trucks). Arena.

February 14 to 21, 1920—Brooklyn, N. Y. Motor Vehicle Dealers' Assn. Show. (Cars and Trucks). 23rd Regiment Armory. I. C. Kirkham, Mgr., 1635 Bedford Ave.

February 14 to 21, 1920—Detroit, Mich. Nineteenth Annual Show. H. H. Shuart, Mgr., 870 Woodward Ave. Passenger Cars, Trucks, Tractors, Accessories.

February 16 to 20, 1920—Manchester, N. H. (Only show in state). Academy. J. J. Callahan, Mgr., Box 808, Pittsfield, Mass.

February 16 to 21, 1920—St. Louis, Mo. Passenger Cars and Trucks in Southern Hotel Building. Accessories in Coliseum. Robert E. Lee, Mgr., 101 S. Ninth St.

February 16 to 21, 1920—Des Moines, Ia. Eleventh Annual Show. Ford Motor Co.'s Bldg. Passenger Cars and Trucks. C. G. Van Vliet, Mgr., 203 Observatory Bldg.

February 16 to 21, 1920—Kansas City, Mo. Fifth Annual National Tractor Show. Kansas City Tractor Club. Guy H. Hall, Mgr., Sweeney Bldg.

February 20 to 27, 1920—Albany, N. Y. Annual Show. State Armory.

February 21 to 28, 1920—Ottawa, Ontario. Motor Show.

February 21 to 28, 1920—San Francisco, Cal. Fourth Annual Pacific Automobile Show. Exposition Auditorium. G. A. Wahlgren, Mgr., 933 Monadnock Bldg. Cars, Trucks, Tractors, Accessories.

February 23, 1920—Pittsfield, Mass. State Armory. J. J. Callahan, Mgr., Box 808.

February 23 to 28, 1920—Portland, Ore. Dealers' Motor Car Assn. Show. Passenger Cars and Accessories only. M. O. Wilkins, Mgr., 312 Commonwealth Bldg.

February 23 to 28, 1920—Louisville, Ky. 12th Annual Louisville Auto Dealers' Assn. First Regt. Armory.

February 23 to 28, 1920—Grand Rapids, Mich. Commercial Car, Truck and Tractor Show. Auspices Auto Business Assn.

February 23 to 28, 1920—Springfield, Ohio. Car and Accessory Show. Auspices Auto Business Assn.

February 23 to 28, 1920—Deadwood, S. D. Deadwood Business Club's Seventh Annual Show. F. R. Baldwin, Mgr. Passenger Cars, Trucks, Tractors.

February 23 to March 6, 1920—Grand Rapids, Mich. First week, Passenger Cars, Accessories. Second week, Trucks and Tractors. Furniture Exposition Building. M. D. Elgin, Mgr.

February 24 to 28, 1920—Kansas City, Mo. Motor Car Dealers' Show. Convention Hall. E. E. Peake, Mgr. Passenger Cars, Trucks and Accessories.

February 25 to 28, 1920—Charleston, W. Va. Armory. M. L. Crowley, Mgr.

February 28 to March 6, 1920—Newark, N. J. Trade Assn. Claude Holgate, Mgr., 343 High St. Passenger Cars, Trucks, Accessories.

February or March (date to be set)—Topeka, Kans. L. W. Warner, Sec., 121 N. Kansas Ave.

March 1 to 6, 1920—Omaha, Neb. Fifteenth Annual Show. Auditorium. C. G. Powell, Mgr., 2051 Farnum St. Passenger Cars, Trucks, Tractors.

March 1 to 6, 1920—Springfield, Mass. Fifth Annual Show. Auditorium. Passenger Cars, Trucks, Accessories. 168 Bridge St.

March 1 to 6, 1920—Perth Amboy, N. J. Eighteenth Annual Car Show. Auspices Auto Dealers' Assn.

March 1 to 6, 1920—Scranton, Pa. Car, Truck and Tractor Show. Auspices Motor Trades' Assn. Armory. Hugh B. Andrews, Mgr.

March 1 to 6, 1920—St. Joseph, Mo. Passenger Cars, Trucks, Tractors, Accessories. John Albus, Mgr., P. O. Box 303.

March 1 to 6, 1920—Syracuse, N. Y. Car and Truck Show. Auspices Auto Dealers' Assn. Howard H. Smith, Mgr.

March 1 to 6, 1920—Buffalo, N. Y. Eighteenth Annual Auto Dealers' Show. Broadway Auditorium.

March 1 to 13, 1920—St. Louis, Mo. First Annual Mississippi Valley Exposition.

March 1 to 13, 1920—Scranton, Pa. Tenth Annual Show. Armory. Hugh B. Andrews, Mgr., 411 Board of Trade Bldg. Passenger Cars and Accessories, 1 to 6; Trucks and Tractors, 9 to 13.

March 2 to 6, 1920—Springfield, Ill. First Annual Show. Passenger Cars, Trucks, Tractors, Accessories. Jack Brodhead, Mgr., 413 S. Fourth St.

March 2 to 6, 1920—Denver, Colo. Car and Truck Show. Auspices Auto Trades Assn. of Colorado. Denver Union Stockyards Area.

March 2 to 6, 1920—Little Rock, Ark. Third Annual Show. Cars, Trucks, Tractors, Accessories, Farm Lights. A. W. Parke, Sec., P. O. Box 699.

March 3 to 6, 1920—Lancaster, Pa. Auto Trade Assn. Annual Show. R. W. Schrierer, Mgr., 117 East King St.

March 3 to 6, 1920—Clinton, Iowa. Fifth Annual Show. Passenger Cars, Trucks, Accessories. H. G. Finch, Mgr., 127 Sixth Ave.

March 7 to 13, 1920—Muskegon, Mich. Armory.

March 8 to 13, 1920—Paterson, N. J. Fourth Annual Show. Fifth Regiment Armory. H. MacGinley, Mgr.

March 8 to 13, 1920—Indianapolis, Ind. Twentieth Annual Show. State Fair Grounds. Passenger Cars, Trucks, Accessories. John B. Orman, Mgr., 338 Delaware St.

March 8 to 13, 1920—Rock Island, Ill. Annual Tri-City Auto Trade Assn. Show. Billy Sunday Tabernacle. C. G. Van Vliet, Mgr., 218 Ripley St., Davenport, Iowa.

March 8 to 13, 1920—Syracuse, N. Y. Twelfth Annual Show. State Armory. Passenger Cars, Trucks, Trailers, Tractors, Accessories. H. H. Smith, Mgr., 207 University Bldg.

March 12 to 14, 1920—La Salle, Ill. Illinois Valley Dealers' Assn. Show.

March 13 to 20, 1920—Boston, Mass. Eighteenth Annual Automobile Show. Chester I. Campbell, Gen. Mgr., 5 Park Square.

March 15 to 21, 1920—Seattle, Wash. Wm. J. Coyle, Mgr., 1321 Seneca St. Passenger Cars, Trucks, Accessories.

March 22 to 27, 1920—Trenton, N. J. Car and Truck Show. Armory.

March 22 to 27, 1920—Wilkes-Barre, Pa. Commercial Cars. R. A. Rosenkrans, Sec., 35 N. Washington St. (Automobiles, 15th to 22nd.

March (date to be set)—Jersey City, N. J.

March 22 to 27, 1920—Oklahoma City, Okla. Third Annual Farm Power Show. Oklahoma Farm Power Equipment Club. A. E. Kull, Secretary, 3-5 East Reno St. Trucks, Tractors, Accessories and Farm Power Equipment.

March 31 to April 3, 1920—Goldsboro, N. C. Passenger Cars, Trucks. W. M. Jones, Mgr.

Society of Automotive Engineers

New York City, N. Y. Society of Automotive Engineers. Coker F. Clarkson, Sec., 29 W. 39th St. Society and Section Meetings. Feb. 27, Pennsylvania Section. Pittsburgh. Feb. 27, Detroit Section. Detroit, Mich. Non-Ferrous Alloys. March 3, Minneapolis Section, Minneapolis. Dynamometer Tests. March 27, Buffalo Section. Buffalo. April 7, Minneapolis, Section, Minneapolis. Tractor Weights and Drawbar Pulls.

Foreign Events

Adelaide, Australia, March, 1920—All-Australia Exhibit. Motor Vehicles, Airplanes, Engines and Automotive Equipment.

Buenos Aires, Argentine, April 3 to May 4—Exposition of U. S. Manufactures.

London, England, April or May, 1920—Commercial Vehicle Exhibition. Olympia.

Lyons, France, March 1 to 15, 1920—Spring Exposition.

Dealers' Association is to be Reorganized

INDIANAPOLIS, IND., Jan. 30.—Looking into what is obviously a new day in the motor vehicle business, the Indianapolis dealers have started to reorganize their association to make it more capable and more active. This action has been begun on the recommendation of the new president, R. V. Law. He has advocated a slight reorganization of the association somewhat as follows:

1. To base the cost of membership on the pro-rata value of the organization's assets rather than a regular stipulated amount for dues.

2. Organize the different classes of members into divisions, that is to say, a truck members' division, accessory members, passenger car members, and the like, and do constructive work for each class of membership.

3. There should be regular monthly meetings of the full membership at which a constructive program should be held. There are so many things the dealers have in common that an interchange of systems and ideas can be most beneficial.

4. The question of social intercourse is of prime importance. The bringing about of more friendly relations between dealers and their respective sales organizations will set up better feeling and even co-operation in some instances.

5. I strongly advocate a clearing house in the association offices for labor of all kinds that is used by the dealer organizations. Also an effective credit department.

In general: We should go in for a constructive program during the coming year and organize our defenses so that members will not be stampeded at the first signs of the turn of tide.

Truck Important Factor in Near East Relief

When the story of the relief work being carried on under the auspices of the Near East Relief is finally told, it will be found that the American motor trucks played one of the most important and most efficient parts in saving the remnants of a stricken nation. Railway, auto, camel, wagon train, and even man trains are being used to carry the food and clothing from the coast to the interior bases, but of all these the truck is the most important. A large number of the inland districts are reached by a system of motor transport which has been built up among many difficulties, not the least of which are raids by bandits. Many members of its large personnel include officers and privates of the A. E. F.

The transport trains are usually made up of from ten to twenty trucks. The trains are all heavily guarded and are sent over roads that would seem impassable to any but youthful American drivers. There is not a gas nor a supply station along the route, and the trucks carry their own gas and repair necessities. Aside from the bandits, tires offer the biggest problem to the driver. The rough rocks of the mountains and the sharp desert sands make quick work of them. The Near East Relief motor driver has to be a real emergency man and be accustomed to handling the wheel under any and all road conditions and above all imbued with the get there spirit.

Joint Meeting of Metropolitan and Pennsylvania S. A. E.

PHILADELPHIA, PA., Jan. 23.—About 200 were in attendance at the joint meeting of the Pennsylvania and the Metropolitan sections of the Society of Automotive Engineers which was held here yesterday. Diesel engines were the chief topic of discussion.

In the afternoon a visit was made to the Navy Yard at League Island where the Diesel engines taken from the German submarine U-117 were inspected. One of these were set up and a few short tests made. While at the Navy Yard the engineers also visited the Naval Aircraft Factory which is located there.

After dinner at Kugler's restaurant a very forceful and comprehensive paper was read by Hubert Verhey, head of the Diesel Engine Unit of the Emergency Fleet Corp. Mr. Verhey treated upon the modern practice in heavy marine oil motor installations and the development possibilities. The paper was illustrated with a number of working diagrams and photographs of typical marine installations.

Trucks Used in Clearing Highways of Snow

HARTFORD, CONN.—The equipment of the Connecticut State Highway Commission has been instrumental in keeping the highways of the state cleared of snow all winter. All the trucks in the department are equipped with snow plows and immediately after there is any fall of snow the cars are set to work. Such excellent results have been obtained that at times the common carriers have been stalled and the motor cars and trucks went over their routes as usual without any interruption whatsoever.

The department plans to spend over $3,000,000 this year in road improvement. Work is still being continued on some of the heavily travelled turnpikes despite the weather.

Colonel H. B. Joy Heads Highway Association

DETROIT, MICH., Jan. 30.—At the annual meeting of the Board of Directors of the Lincoln Highway Association, Colonel Henry B. Joy was unanimously chosen to succeed F. A. Sieberling, who resigned as president of the association. In his address following his election as president, Colonel Joy said that he felt that the organization could already feel itself assured of ultimate success in the accomplishment of all the aims for which it was incorporated in 1913.

W. C. Durant, president of the General Motors Co., and J. N. Nunn, president of the United States Rubber Co., were elected to the Board of Directors.

Boston to Display Many New Models

BOSTON, Feb. 10.—The attention of the industry is now focused on Boston and its automobile show, which is in the making. Two of Boston's largest exposition structures—Mechanics' Building and the Irvington Street Armory—will house the display, yet these great buildings are by far too small to accommodate the clamoring crowd of manufacturers of passenger cars, trucks and accessories that desire to show their goods to the New England motor public.

The Boston show, which will open March 13, will have a much larger range of exhibits than those displayed at the New York show, for many cars that were not included in the Grand Central Palace exhibit are to be shown in Boston. The automobile market is teeming with new makes of cars, trucks and accessories and the best of these will be displayed here.

The record breaking display will no doubt attract the greatest crowd on record. Annually the Boston show is viewed by nearly 300,000 persons. This is the gate in normal times, but with such a wide variety of new things to be seen it ought to be a record breaking crowd. "My advice to the 10,000 agents and dealers throughout New England is to make arrangements for their hotel accommodations immediately," says Mr. Campbell.

He hopes to make the dual show the most attractive that he has ever staged. He has already passed the contract for an elaborate scheme of decorations that will be in keeping with the spring season that will be on at the time that the show opens.

"Traffic Control" a Problem of the Immediate Future

Whenever one is in close association with Motor Transport men one is bound to hear that mysterious term "traffic control," which immediately produces a mental image of the "cop" standing in the center of the street and beckoning the machines to advance, stop, turn, etc. But such is not the interpretation given to the term by the initiated. It is a purely military term and refers to a function exercised by the higher commanders to secure the best possible approach to the practicable passenger or ton-mile-hour capacity of roads and terminals. It involves not only the giving of orders for the dispatching of transportation, but more particularly that observation of how those dispatcher's orders are followed as to routes, time schedules, cargo loading, condition of vehicles enroute, road discipline, etc. It is the result of previous experience in the handling of motor transports.

Previous to the World War, the military and the commercial world had been accustomed to handling only a small amount of passenger and freight traffic over the highways. The war quickly showed us the possibilities of the motor truck. And then came the Motor Trans-

port on a large scale. Its advent was followed by "traffic control" which had really originated on a very small scale in civil life. The part that it is to play in civil life is beyond the power of any person to predict, because as yet our highways are not taxed to 100 per cent capacity. It is still easy to divert traffic to different channels, and to widen congested streets. The situation has not become acute enough to demand an approach to the solution forced upon military men. When it does come, however, it will be a most difficult problem to solve because it will lack the unity of purpose and the discipline of military control and the solution will have to cope with individuality. However, the solution must come and the sooner the better. The present is not too soon to begin, for our highways are becoming more and more congested and it is up to us to give the matter of "traffic control" the most serious thought and action lest it be too late.

New Directors for M. A. M. A.

NEW YORK CITY, Jan. 18.—At its annual meeting held during show week the Motor and Accessory Manufacturers' Association chose the following to direct the activities of the association during the ensuing year: E. E. Allyne, president of the Aluminum Castings Co.; J. M. McComb, assistant treasurer, Crucible Steel Company of America; G. Brewer Griffin, manager of the automobile equipment department of the Westinghouse Electric Co. W. O. Rutherford, vice-president of the B. F. Goodrich Rubber Co., Akron, Ohio, was re-elected to the board. The retiring members of the board are C. W. Stiger, J. H. Foster and J. T. Wetzel.

About 600 attended the annual banquet and vaudeville show which followed the meeting. The entertainment included the first photoplay production of the association, which consisted of a one-reel film entitled "Our Own Topic of the Day." It was plotted and planned and produced solely for the entertainment of the association.

Trailers Prevent Forfeiture of Contract

DETROIT, MICH., Jan. 20.—The J. C. Widman Co. held a contract for the manufacture of automobile bodies for the Ford Motor Co. which stipulated that failure to deliver a certain number of bodies each day would be penalized. The company had no difficulty in getting the required number manufactured for each day's delivery, but it was almost impossible to get them delivered. Various cartage companies employed proved to be inadequate. Finally in sheer desperation, the Widman company presented its problem to the Fruehauf Trailer Co. They soon settled the matter by ordering three trailers of special design and putting them to work. The bodies are now being delivered as fast as they can be produced and at a saving of $40 per day to the Widman company.

Ireland Seeks American Cars

NEW YORK CITY, Jan. 20.—The Irish Trade Commission to America, Suite, 204, 280 Broadway, requests that all American automobile manufacturers forward to them their names and the products that they manufacture in order that the work of promoting a closer trade relationship between this country and Ireland might be facilitated. It states that there is a very great opportunity for American manufacturers of automobiles to supply the demand that exists in Ireland at this time, and especially so since there is a popular sentiment afloat in Ireland which is strongly in favor of direct trade with America. This has been made possible by the operation of a line of steamers between America and Ireland.

Use of Truck Permits Tripling of Output

CHICAGO, ILL., Jan. 13.—Daniel Burkhartsmeier, president of a well-known cooperage concern, attributes the fact that his company is doing three times the business it did four years ago to the fact that the motor truck has proven such a splendid selling machine. In 1914 Mr. Burkhartsmeier purchased a 5-ton Pierce-Arrow truck and soon discovered that his business field has been increased eight fold. He now owns and operates one 5-ton and six 2-ton units. His deliveries are now made distances of 65 miles where before, with the use of horses, they were limited to from eight to ten miles.

According to Mr. Burkhartsmeier the "trucks cover a much larger area, enable quicker deliveries, permit a faster turnover, effect the economy of a larger production fostered by them, and give us direct advertising through their presence on the streets."

New York University to Add Transportation Engineering

NEW YORK CITY, Jan. 22.—Beginning with the new term in February a course in motor transportation engineering is to be included in the curriculum of New York University. The course will be conducted by F. Van Z. Lane, chief transportation engineer of the Packard Motor Car Co., Detroit. It will form a part of the new course in industrial engineering and will be open to students matriculated in the schools of mechanical and civil engineering.

The course will have more to do with the application of the motor truck than the mechanics of it and will not be confused with motor truck design. The lectures will include: The Future of the Motor Truck, Motor Truck Operating Costs, Motor Trucks Versus Horses, Motor Trucks Versus Railroads, Trailers and Semi-Trailers, Special Bodies, Loading and Unloading Devices, etc.

Practical Assistance Urged for Europe

WASHINGTON, D. C., January 23.—In explaining the export finance bill, which was sponsored by him and has just become a law, Senator Edge, of New Jersey, claims it would be possible for a group of business interests in this country to finance Europe for more than $1,000,000,000 without a strain on their resources and with profit to themselves.

He asserts that the financing of these impoverished foreign purchasers of American goods will open the world markets, which are necessary to the United States if it is to maintain its high pressure production, for on the production of finished goods depends the demand for raw material which will affect even the land and water transportation systems of the country.

Mr. Edge urges that, instead of lending these people money, as so much charity, we get to work, co-operate with the foreigners, help them reconstruct their factories, devastated fields, etc., and so convert their credit into cash.

Dart Reports Predict a Very Prosperous Year

WATERLOO, IA., Jan. 20.—Reports of the officers at the annual meeting of the Dart Truck & Tractor Corp. show the affairs of the company to be in excellent shape and the stage all set for the most prosperous year of the company's existence. Already orders have been booked for 1920 which equal those of any previous year. As a result the company is planning to expand during the year in order that it may take care of orders which arrive from now on.

The following officers and directors were elected: C. C. Wolf, president; W. H. Johnson, vice-president; M. D. Herron, vice-president; E. L. Stover, secretary and treasurer. Members of the Board of Directors are C. C. Wolf, W. H. Johnson, M. D. Herron, W. L. Stover and S. Y. Eggert.

Correction

The Flint Motor Axle Co., Flint, Mich., has called our attention to a mistake inadvertently made in a description of its product published on page 45 in the January issue of the COMMERCIAL CAR JOURNAL. Statement was made that the axle "is now being manufactured on a large quantity basis at the Flint factory," whereas it should have read, "Having spent considerable time in experiment and tests to prove the value of the type and the durability of the parts, the manufacturers are preparing for quantity production."

Walter S. Burgess Mfg. Co., manufacturers of the Burgess rebound and check shock absorbers, have discontinued the service of their former sales agents, the Zinke Co., Chicago, Ill., and will, in the future, handle all sales directly from the factory at St. Joseph, Mich.

W. H. Alford, vice-president, has been elected to the board of directors of the Nash Motors Company, Kenosha, Wis. Mr. Alford is responsible for the financial affairs of the company.

Arthur Elliott Allen has been made district manager at New York of the Westinghouse Electric & Manufacturing Company. He succeeds Edward D. Kilburn.

J. H. Ambrose, formerly with the Associated Manufacturers' Company, Waterloo, Ia., is now sales manager of the Radiant Manufacturing Company, Sandusky, O.

H. C. Barnes is now associated with the Allegheny Gear Works at Pittsburgh as superintendent of laboratory and metallurgical work. Mr. Barnes is a graduate of a technical school and has had more than ten years' practical experience.

A. E. Berdon has resigned as research engineer for Dodge Bros., Detroit, Mich.

E. W. BeSaw has been made general sales manager of the Firestone Tire & Rubber Co., Akron, O. He succeeds A. G. Partridge, who has been elevated to a vice-presidency.

Lloyd J. Bohan has severed his connection with the Gurney Ball Bearing Company at Chicago and is now sales representative in Chicago and territory west for the Torbensen Axle Company.

W. C. Calvert has been chosen to head the motor haulage analysis department of the Oneida Motor Truck Company, Green Bay, Wis. Mr. Calvert's experience as superintendent of national motor equipment with the Wells-Fargo Express Company and later with the American Express Company makes him particularly well fitted for the position.

Thomas Clements has been appointed vice-president in charge of offices and purchases of the Firestone Tire & Rubber Company, Akron, O.

Charles C. Craig has been promoted to the position of sales manager of the Stewart Motor Corporation, Buffalo, N. Y. He takes his new position on March 1st and succeeds W. J. Male, who resigned to act as distributor of Stewart trucks in Buffalo and vicinity.

L. G. Fairbanks has been appointed vice-president and general manager of the Firestone Steel Products Co., a subsidiary of the Firestone Tire & Rubber Co.

R. B. Fisher has been named general sales manager for the Buda Company, Harvey, Ill. He will direct the domestic and foreign sales and advertising departments.

Arthur W. Freund has been chosen manager of the new National Sales Development Department of the Swinehart Tire & Rubber Co., Akron, O.

Personal Items

David Geddes has been made territory manager for the Head Motor Company, Des Moines, Ia., state distributors for the Gary truck.

Howard B. Hall has resigned as vice-president and director of the export activities of the Bethlehem Motors Corporation, Allentown, Pa.

Harry Harmer has severed his connection with the White Company of Chicago, and is now Chicago branch manager of the Service Motor Truck Company.

R. H. Jeffers, manager of the Detroit branch of the Firestone Tire & Rubber Company, has been chosen for general manager of the new Firestone factory at Hamilton, Ontario.

James J. Jennings has been appointed assistant to the vice-president of the Hudson Motor Specialties Company, Philadelphia, Pa.

Edward G. Kilburn has been elected vice-president and general manager of the Westinghouse Electric International Company. He has been New York district manager of the Westinghouse Electric & Manufacturing Company since 1917.

A. L. Kimball has joined the sales force of the Pierce Governor Company, Anderson, Ind., in the capacity of sales engineer. His territory includes that east of Indiana. Mr. Kimball was formerly chief engineer of the Fulton Motor Truck Co.

Frederick S. Lawrie has established a branch of his Indianapolis, Ind., business in Milwaukee, Wis. The company is known as the Frederick S. Lawrie Company and markets standard special screw machine products, steel stampings and machined parts.

C. H. LeHuquet, whose appointment as assistant sales manager of the International India Rubber Corporation, South Bend, Ind., was announced in a recent issue, has resigned.

G. Linstrom has been made works manager of the Bethlehem plant of the Roller-Smith Company, New York City, manufacturers of electrical instruments and circuit breakers.

K. F. Love, formerly of the Traffic Motor Truck Corporation, has been appointed representative for the Trailmobile Company, Cincinnati, O. His territory will include St. Louis and vicinity.

Wm. W. McMahan has been named vice-president in charge of the Sandusky Division of the Ajax Rubber Company, Inc. Mr. McMahan is well known in the tire industry because of the important part he played in the development and perfection of the cord tire.

A. L. McMeans has resigned as secretary of Dodge Brothers, Detroit, Mich.

A. G. McMillan has been appointed general sales manager of the Automobile Service Equipment Division of the Fairbanks Company, New York City.

P. H. Mallory has been appointed general sales manager of the Moreland Motor Truck Company of Los Angeles. He will have charge of sales organization of company.

C. H. Mayer has been made assistant sales manager of the International India Rubber Corporation, South Bend, Ind., with headquarters at the factory. Until the time of his promotion he represented the company on the Pacific Coast.

J. F. Mayl has been placed in charge of the sales of the eastern division of the Firestone Tire & Rubber Company. He succeeds L. G. Fairbank.

A. L. Mercer has resigned as assistant director of sales of the War Department. He will become president of a tire and rubber company.

Marshall E. Morris, manager of the Goodyear Tire & Rubber Company's salesmen's department, will become assistant general manager of the California Goodyear Company and a member of the board of directors.

Arthur T. Murray has resigned as president of the Bethlehem Motors Corporation, Allentown, Pa., so that he may devote his time and energies exclusively to the interests of the American Bosch Magneto Corporation, of which he is also president.

E. F. Paepper, formerly of the Republic Motor Truck Co., Alma, Mich., and the All-American Truck Company, is now chief engineer of the Superior Motor Truck Company, Atlanta, Ga.

A. G. Partridge has been named as vice-president in charge of sales of the Firestone Tire & Rubber Company, Akron, O.

Claude Platt has resigned as special factory representative of the Fisk Rubber Company, Chicopee Falls, Mass.

A. G. Ripberger is now chief engineer for the steel and tube department of the main plant of the Timken Roller Bearing Co., at Canton, O. He was formerly associated with the engineering staff of the Illinois Steel Company, Gary, Ind.

A. A. Roelofs has been made manager of the Chicago office of the Precision & Thread Grinder Manufacturing Co., Philadelphia, Pa., makers of multi-graduated precision grinder.

Charles P. Hughes

Who has resigned as assistant to the president of the Marmon-Chicago Company, and is now field secretary of the Automotive Equipment Association.

Fred Rodger Imhoff

Who has been promoted field engineer for the Precision and Thread Grinder Manufacturing Company, 1932-34 Arch Street, Philadelphia, Pa.

L. L. McAnaney

Who has been appointed manager of the Baltimore Branch of the McGraw Tire & Rubber Company.

H. A. Grubb

Who has been appointed vice-president and acting general manager of the Oldfield Tire Company, Cleveland Ohio.

F. C. Rudisell has resigned as manager of the St. Louis branch of the Firestone Tire & Rubber Co. and is now associated with the Overland Tire Company, of Omaha, Neb.

Samuel E. Ryder has been appointed equipment engineer of the Moto Meter Company, Inc., Long Island City, N. Y.

Walter G. Schacht has been named manager of the New York organization of the Multibestos Company, of Walpole, Mass. His temporary headquarters are at 158 Robinson St., Brooklyn, N. Y.

D. O. Skinner has resigned as advertising manager of the International Motor Company, New York City, after six years' association in this capacity. He will devote his time to personal interests.

John T. Spicer has been promoted from advertising manager to general sales manager of the Thermoid Rubber Co. He will have his offices at the factory in Trenton, N. J.

M. F. Stapleton has been appointed western sales manager of the Radiator Division of the Marlin-Rockwell Corporation. He will have his headquarters in the Kresge Building, Detroit, Mich.

F. K. Starbird has succeeded E. W. BeSaw as western sales manager of the Firestone Tire & Rubber Company.

C. F. Stewart is now general sales manager of the All-American Truck Co., Chicago, Ill. He is in charge of sales and advertising.

Fred J. Storm has joined the Sewell Cushion Wheel Company, Detroit, Mich., in the capacity of assistant general manager. He will also have charge of the merchandising of the Sewell Cushion Wheel product.

P. Arthur Tanner has been transferred from the Sumter Division of the Splitdorf Electrical Company to Newark, N. J. Mr. Tanner was advertising manager of the Sumter Division.

J. W. Thomas has been made vice-president in charge of manufacturing of the Firestone Tire & Rubber Company, Akron, O.

Jerry J. Tobias has been chosen to serve in the capacity of equipment sales manager for the Moto Meter Company, Inc., Long Island City, N. Y.

R. B. Tracy, district manager of the Michelin Tire Company, Milltown, N. J., now has charge of the supervision of the sales of the Chicago, Cleveland and Minneapolis branches as well as the new Des Moines and Detroit branches.

C. B. Voorhis, general sales manager, has been made a vice-president of the Nash Motors Co.

R. W. Walker has resigned as assistant general manager of the old Hurlburt Motor Truck Co. He has not announced his plans for the future.

Chas. A. Warren, Seattle, Wash., has been chosen distributor for Sterling tires in northern California.

C. J. Welch has been appointed sales manager of Oneida Motor Truck Co., Green Bay, Wis. He will be in charge of the gasoline division.

J. T. Wilson has been elected a vice- president of the Nash Motors Company. He will likewise continue in his former duties of assistant manager.

Frank B. Willis has been made general manager of the Kelley-Springfield Motor Truck Company, Springfield, O. He was previously associated with the Studebaker Corporation and the Hale Motor Car Company.

Frank E. Wodell has been made assistant sales manager in charge of all sales activities at the New York office of the General Motors Export Company, 1764 Broadway, New York City.

Wilbur W. Wood is now associated with the advertising department of the Traffic Motor Truck Corporation, St. Louis, Mo.

New Agencies

Adam-Hill Company, 96 Ninth St., San Francisco, Cal., have been named official distributors of the Weidely "Bulldog" motors on the Pacific Coast.

Berg-Kinzel Sales Co., 660 Market Street, San Francisco, Cal., will distribute the "Howard" deflector for automobiles in the states of California and Nevada. This deflector was invented by Howard Carter and is manufactured by the Howard Auto Headlight Deflector Co., Detroit, Mich.

Maundrell & Walfish have been appointed distributors of Sterling tires in San Francisco.

City Auto Repair Company, Hartford, Conn., has been appointed exclusive sales and service representative for the United States solid and pneumatic truck tires in this territory.

Black & Decker Mfg. Co., Towson Heights, Baltimore, Md., have established a branch office at 6523 Euclid Ave., Cleveland, O. Garth A. Dodge, formerly of the Austin Company, will be in charge of the Cleveland branch as well as serve in the capacity of branch manager for the states of Ohio and Indiana.

Republic Truck Company, Alma, Mich., has sent L. J. Stogsdill to Logansport, Ind., where he will manage the sales of Republic trucks and parts through the William Sprinkle Auto Company. Territory will include St. Joseph county and Hamilton county.

Barth Motor Car Company, St. Louis, Mo., has discontinued the distribution of King and Columbia passenger cars and is now consolidated with the Master truck agency.

Hyatt Ignition Co., manufacturers of Hyatt Hipower Spark Plugs, have opened a branch at 1780-82 Broadway, New York City.

Lawrence Motor Sales Corporation will distribute Duplex trucks in New York City and the surrounding territory.

Miller Rubber Company, Akron, O., has established a branch in Oakland, California. The Oakland organization is acting under the direction of the big Miller Branch in San Francisco.

Ebert's Broad Street Garage will act as distributors of Signal motor trucks in Philadelphia and the surrounding territory.

Duff Manufacturing Company, Pittsburgh, Pa., manufacturers of lifting jacks, have opened a branch sales office in the Book Building, Detroit, Mich. The new office, which will be in charge of Frank J. Hunt, will handle the output of the Forge Department of the company.

Removals and Trade Changes

Chase Metal Works and the **Chase Rolling Mill Co.,** Waterbury, Conn., are now in their new office building, where the combining of the offices in one building will tend to more prompt and better service.

Borg & Beck Co., manufacturers of clutches, have moved their general offices to 914 S. Michigan Ave., Chicago, Ill.

H. W. Johns-Manville Company has removed its Des Moines offices to 213 Ninth St. The new location will give them better facilities for serving the territory with Johns-Manville products.

Peerless Storage Battery Company, Louisville, Ky., will be known in the future as the Wolke Lead Batteries Companies and their products, the Peerless Red Cap storage batteries, will be styled the Wol-Kee Red Cap batteries. This change of incorporate title will be accompanied by an addition to one of the plants which will permit the company to turn out 750 completed batteries each day.

American Piston Ring Company has changed its name to the American Hammered Piston Ring Co. and is now located at Bush St. and Hamburg Place, Baltimore.

Thomas Clements

Who has been appointed vice-president in charge of offices and purchases for the Firestone Tire & Rubber Company.

P. J. Flaherty

Who has been elected president of the Johnson Bronze Company, New Castle, Pennsylvania. He succeeds G. W. Johnson who died recently.

Fred. G. Storm

Who was recently appointed assistant general manager of the Sewell Cushion Wheel Company, Detroit. He will have charge of the merchandising.

J. W. Thomas

Who has been made vice-president in charge of manufacturing of the Firestone Tire & Rubber Company, Akron, Ohio. He has been works manager.

Walter W. Gaskill, 141 Milk St., Boston, Mass., has superseded the P. I. Perkins Company as representatives in Boston and vicinity, of the Roller-Smith Company, makers of electrical instruments and circuit breakers.

Sidel-Rattner Mfg. Co., Inc., has moved to larger quarters and is now located in the Bush Terminal Building No. 2, Brooklyn, N. Y.

A-Z Company, New York City, manufacturer of honeycomb radiators, has been purchased by and will be known in future as the Ansted Radiator Co., Inc. The new company, which is capitalized at $1,500,000, has taken over the plant and all equipment of the A-Z Co. Frank W. Ansted, of the Lexington Motor Co., Connersville, Ind., holds a large amount of the stock of the new company. L. G. Hammer, formerly vice-president of the A-Z Co., is president of the Ansted Co.; Harry W. Gaston, of the Lexington Motor Co. of New York, is treasurer, and George W. Cole, formerly of the Wire Wheel Corporation of America, is secretary.

Fulton Motor Truck Company has closed its New York offices at 1710 Broadway and is now located at 300 Broadway.

Robertson, Gauss & Company have moved to 50 Union Square, New York City.

Trailer Manufacturers' Association of America is now permanently located on the seventh floor of the Grand Central Palace, New York City.

Republic Truck Company, distributor of Republic trucks in Cincinnati, Ohio, has changed its name to the Five States Motor Company.

Ross Manufacturing Company, Cleveland, Ohio, has moved into its new plant, which is fitted up with all the most modern equipment.

New Incorporations

Fairfield Manufacturing Company, Lafayette, Ind., has been organized to manufacture differential and bevel gears for automobiles. All of the patents, machinery, etc., formerly owned by the Ross Gear & Tool Company, has been taken over by the new company, leaving the Ross Company able to devote its time exclusively to the manufacture of steering gears. D. L. Ross and E. A. Ross, president and vice-president of the Ross Gear & Tool Company, occupy the same position in the new organization, which is now in production.

American Machine Company, Newark, Del., manufacturers of the Atlas Heavy Duty Motor Truck Rear Axle, have completed plans to increase their capitalization for the purpose of doubling their floor space and installing new machinery.

Williams-Hayward Company, Chicago, Ill., has been organized for the manufacture and distribution of varnishes, enamels and paint specialties. The company is backed by 20 years of experience in the manufacture and use of these products. Their general offices and factories are at 2526 West Van Buren St.

Continental Investment Co., Inc., of which James J. A. Fortier is president, has recently organized, in conjunction with the Commercial Credit Company of Baltimore, the Commercial Credit Company of New Orleans. This has a cash capital of $750,000.

Obituary

E. A. Shelly died at his home in Rochester on January 19. At the time of his death Mr. Shelly was assistant sales manager of the Selden Truck Corporation. Previous to his association with the Selden Company he was connected with the Vim Motor Truck Company of Philadelphia.

Robert Clarkson Reid died very suddenly on January 11. Mr. Reid was secretary of the Harrolds Motor Car Company, distributors of Pierce-Arrow passenger cars and trucks in New York City.

Albert Schmidt, of the Westinghouse Electric Company, died recently in New York City. Mr. Schmidt's death is a great loss to the engineering world, in which he has been closely associated with the early development of electricity in the United States. He played a prominent part in the development of the gas and gasoline engine, his latest work being on a carbureting system for internal combustion engines.

C. E. Williams, whose appointment as general sales manager of the Sanford Motor Truck Company, of Syracuse, N. Y., was recently announced in these columns, died on January 29 after a short attack of pneumonia. Previous to his affiliation with the Sanford Company Mr. Williams had been associated for a number of years with the Selden Truck Corporation in the capacity of sales manager. Although a young man Mr. Williams was well known and promised to become one of the leaders in his field.

Universal Motor Supply Co., Inc., Boston, Mass., has been incorporated for the sale of automobile lubricants and accessories. It has the sole agency in New England for the Tulc products of the Universal Lubricating Company, of Cleveland, Ohio. They will also distribute Atlantic motor oils and various automobile supplies. Officers of the company include: J. R. MacCollum, president; C. D. MacDonald, vice-president, and H. A. Saiving, secretary and treasurer.

Spaulding Chain Corporation, Bloomfield, N. J., has been organized for the manufacture of steel roller chains and sprockets for tractors, motor cultivators, motor trucks and industrial machinery. It has been successful in acquiring a plant with 125,400 sq. ft. of floor space. It plans to manufacture 2500 ft. of chain per day.

Dittmer Gear & Manufacturing Corporation, capitalized at $175,000 for the manufacture of gears and transmission gear sets, is erecting a plant at Lockport, N. Y.

United States Motor Truck Company, Cincinnati, Ohio, recently voted to increase its capital stock from one million to two and one-half million dollars.

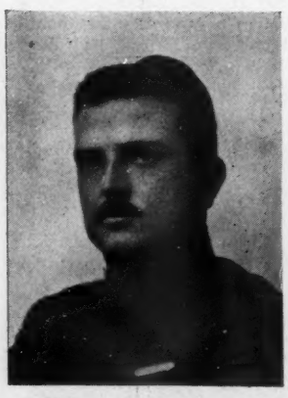
Parts Service Co., Cleveland, O., has been organized for supplying service parts for popular cars, trucks and tractors. It carries a large stock of valves and all kinds of bolts, as well as other necessary service parts. It is located at 5105 Euclid Ave.

Factory News and Capital Increases

New Departure Mfg. Company, Bristol, Conn., manufacturers of ball bearings, are making several extensive additions. When these are completed the plant will be capable of turning out 16,000,000 ball bearings per year.

George P. Clark Company, manufacturers of trucks and casters, Windsor Locks, Conn., opened an addition to its plant on January 1.

S. F. Bowser & Company, Fort Wayne, Ind., manufacturers of oil and gasoline storage systems, has organized a subsidiary company for the sale and distribution of Bowser products in the state of Texas as well as Oklahoma, Arkansas and New Mexico. The new company is known as S. F. Bowser & Company of Texas and will have its headquarters at Dallas.



L. E. McConnell, Jr.
Who will represent the advertising department of the COMMERCIAL CAR JOURNAL in New York State and Newark, N. J. He had years of experience in the advertising field.

Fenton J. Spaulding
Who heads the recently organized Spaulding Chain Corporation, Bloomfield, N. J., and was formerly associated with the production of transmission chain in the Link Belt Co.

B. G. Koether
Who has been made vice president of the Hyatt Roller Bearing Company. He will be head of the entire sales and advertising departments; headquarters at Harrison, N. J.

A. G. Partridge
Who has been named vice president in charge of sales of the Firestone Tire & Rubber Company, Akron, Ohio. He was formerly general sales manager of this company.

KEY OF ABBREVIATIONS

Used in the Specifications of Commercial Cars Listed on the Pages Following

In all Specifications { O—Own / Q—Optional }

Engine:
Beav—Beaver
Cont—Continental
GBS—Golden, Belknap & Swartz
Her—Hercules
Hink—Hinkley
H-Sp—Herschell-Spillman
Lyco—Lycoming
Rut-Rutenber
Ster—Sterling
Vict—Victory
Wau—Waukesha
Wis—Wisconsin

Valve Arrangement:
I—Overhead
L—ELL-Head
T—TEE-Head
S—Sleeve

How Cooled:
A—Air
C—Centrifugal Pump
G—Gear Pump
P—Water Pump
T—Thermo-Syphon

Radiator (Make or Type):
Bus—Bush
Can—Candler
EM—English-Mersick
Eur—Eureka
Fed—Fedders
Flex—Flexo
GO—G. & O.
Har—Harrison
Hon—Hooven
Idl—Ideal
Lng—Long
McC—McCord
May—Mayo
Per—Perfex
R-T—Rome-Turney
Spar—Sparton
Spi—Spirex
Stan—Standard
C—Cellular
T—Tubular
H—Honeycomb
V—Vertical

Size of Tires:
*—Pneumatic
†—Dual

Lubrication:
C—Centrifugal Pump
F—Force Feed
G—Force and Gravity
B—Force and Splash
P—Pump

Carburetor:
B&B—Ball & Ball
Bent—Bennett
Cart—Carter
Ens—Ensign
Fich—Flechter
Holl—Holley
John—Johnson
Mar—Marvel
Mas—Master
Mill—Miller
Strm—Stromberg
Shk—Shakespeare
Sheb—Schebler
Till—Tillotson
Zen—Zenith

Fuel Feed:
G—Gravity
P—Pressure
V—Vacuum

Ignition System:
Aer—Aero
AtK—Atwater-Kent
AuL—Auto-Lite
Bat—Battery
Bos—Bosch
Ber—Berling
Con—Connecticut
Del—Delco
Eis—Eisemann
Kin—Kingston
Mag—Magneto
NE—North East
POL—Prest-O-Lite
Sim—Simms
Spl—Splitdorf

Engine Starter:
L—Auto-Lite
B—Bijur
D—Dyneto
G—Gray & Davis
E—Leece-Neville
N—North East
R—Wagner

Clutch:
B—Borg & Beck
C—Cone
D—Disc
F—Fuller
G—Detroit Gear & Mach.
H—Hartford
L—Brown-Lipe
M—Merchant & Evans (Hele-Shaw)
U—Muncie
W—Warner

Transmission:
B-Li—Brown-Lipe
Cott—Cotta
Covt—Covert
D-Sea—Driggs-Seabury
Det—Detroit
Durst—Durston
Full—Fuller
G-Lee—Grant Lees
MM—Mechanics Mach. Co.
Munc—Muncie
Plan—Planetary
Rock—Rockford
Selec—Selective
Warn—Warner

Location of Transmission:
A—Amidships
R—Rear
U—Unit with motor
UJ—Unit with Jackshaft

Final Drive:
B—Bevel Gear
C—Chain
N—Concentric Spur
E—External Spur Gear
F—Friction
I—Internal Gear
S—Spiral Bevel
P—Spur
W—Worm
R—Double Reduction

Universal:
Acm—Acme
Arv—Arvac
Bld—Blood Brothers
Flex—Flexite
Hart—Hartford
K-B—Kinsler-Bennett
Mech—Mechanics
M & E—Merchant & Evans
Pet—Peters
Spic—Spicer
Ster—Sterling
Ther—Thermoid
UM—Universal Machine
UP—Universal Products

Rear Axle:
Badg—Badger
Cel—Celfor
Chi—Chicago
Cl—Clark
Emp—Empire
Hind—Hindley
Own D—Dead, Own design
W—Westinghouse
Rock—Rockford
Russ—Russel
Sals—Salisbury
Shel—Sheldon
Stan—Stan-Par
Tim—Timken
Torb—Torbensen
W-M—Weston-Mott
Wis—Wisconsin
Flot—Floating
½-Fl—Semi-Floating
¾-Fl—¾ Floating

Springs:
Bran—Brantford
Cham—Champion
Det—Detroit
GC—Garden City
Kal—Kalamazoo
Lah—Laher
Mar—Maremont
Math—Mather
Mer—Merrill
Nat—National
Row—Rowland
Per—Perfection
Shel—Sheldon
SP—Spring Perch
Stan—Stan-Par
Ster—Sterling
Tem—Temme
Tut—Tuthill
US—United States
Cant—Cantilever
Elip—Full Elliptic
S-El—Semi-Elliptic
¾-El—¾-Elliptic
S&C—Semi and Cantilever
S&¾—Semi and ¾-Elliptic

Steering Gear:
CAS—C. A. S. Products Co.
Dit—Ditwiler
Gem—Gemmer
Jac—Jacox
Lav—Lavine
Ross—Ross
W—Worm
Warn—Warner
Wohl—Wohlrab

Governor:
C—Centrifugal
Cont—Continental
Del—Delaney
Dup—Duplex
Hink—Hinkley
Mer—Merrill
McC—McCanna
Mon—Monarch
Pier—Pierce
Rug—Ruggles
Simp—Simplex
Wau—Waukesha

Wheels:
Arc—Archibald
AuW—Auto Wheel
Bim—Bimel
Cla—Clark
Day—Dayton
Det—Detroit
E&O—Eberly & Oris
Hay—Hayes
Hoo—Hoopes Brothers
Jon—Jones
Kel—Kelsey
Mil—Military
Mut—Mutual
Pru—Prudden
Roy—Royer
Rus—Russell
Sal—Salisbury
Sch—Schwartz
Smi—Smith
Sta—Stanwell
StM—St. Mary
Stn—Standard
Wan—Wayne
W&L—Waterhouse & Lester

Rim Equipment:
Bak—Baker
Det—Detroit
Fir—Firestone
Gdy—Goodyear
Jax—Jaxon
Kel—Kelsey
Stn—Stanweld

Commercial Car Specifications—Corrected Monthly

The Specifications, Chassis Prices, Etc., Are Corrected Each Month From Data Supplied Direct by the Makers. Gasoline Tractor-Trucks and Electric Commercial Cars Will be Found at the End of Gasoline Commercial Cars

See Also Replacement Table in "Service and Repair Departments." Truck Frame Dimensions Are Included in Replacement Table

(All New Models and Changes in Current Models Are in Heavy Type)

(Where prices are not given they may be had on application to the manufacturer)

Model	Chassis Weight	Chassis Price	Engine—4 Cyl. unless otherwise noted	Bore and Stroke	Horsepower	Valve Arrange't	How Cooled	Radiator Make or Type	Lubrication	Carburetor	Fuel Feed	Ignition System	Engine Starter	Clutch	Transmission	Speeds Forward	Location of Transmission	Universal	Final Drive	Rear Axle	Total Gear Reduction in High	Total Gear Reduction in Low	Springs	Front Tires	Rear Tires	Steering Gear	Wheelbase	Governor	Wheels—Make	Rim Equipment	Pr. Cent of Weight on Rear Wheels
800 Pounds															**800 Pounds**																
Overland	1777	900	Own	3⅛x5	18.2	L	T	C	B	Till	...	Con	L	C	Selec	3	....	Own	B	¾-Fl	.....	.....	S&C	31x4*	31x4*	Own	104	.....	.....	.....	63.8
Pony	800	320	Own	2¾x4	12.1	L	T	H	B	Strm	G	AtK	...	...	Fric	3	....	Dead	C	O	4.25:1	12.25:1	Tut	28x3	28x3	Own	92	.....	Pru	.....	60
1000 Pounds															**1000 Pounds**																
Dodge	1975	1010	Own	3⅞x4½	24.1	L	C	T	B	Stew	V	Own	N	D	Selec	3	U	Own	S	Flot	4.16:1	19.41:3	.....	33x4	33x4	Own	114	.....	Own	Own	41
Ellsworth 25A	2100	....	Lyco	3¼x5	16.9	L	T	T	S	Cart	G	Con	A	C	GLee	3	U	Stan	B	Gem	4.75:1	16:1	Shel	30x3½*	30x3½*	Fos	108	.....	Sal	Det	70
Vim 27	2120	1095	Own	3 x4½	14.4	L	T	McC	B	Zen	G	Atk	...	C	Selec	3	U	Spic	W	Shel	5.5:1	.....	Shel	31x4*	31x4*	C.A.S.	108	.....	Hoo	Fir	....
Vim 28	2250	1350	Own	3 x4½	14.4	L	T	McC	B	Zen	G	AtK	...	C	Selec	3	U	Spic	W	Shel	5.5:1	.....	Shel	32x4½*	32x4½*	C.A.S.	127	.....	Hoo	Fir	....
1200 Pounds															**1200 Pounds**																
Overland	2179	....	Own	4⅛x4½	27.2	L	T	C	B	Till	...	Con	L	C	Selec	3	....	Own	S	¾-Fl	.....	.....	S-El	33x4½*	33x4½*	Own	106	.....	.....	.....	68.8
1500 Pounds															**1500 Pounds**																
Atlas 20	2320	1260	Lyco	3½x5	19.6	L	T	H	S	Sheb	...	AtK	R	B	Selec	3	....	Arv	B	Hess	.....	.....	Row	32x4½*	32x4½*	CAS	118	.....	.....	.....	60
Dispatch G	2200	1200	Wis	3¾x5	22.5	L	T	C	F	Rayf	...	Bos	U	O	Own	4	....	Bld	C	Dead	.....	.....	Tut	34x4*	34x4*	W	120	.....	.....	.....	50
G.M.C. 16	2940	....	Cont	3¾x5	22.5	L	C	McC	S	Mar	G	Eis	...	D	Selec	3	U	UM	B	WM	6:1	21.9:1	Det	35x5*	35x5*	Jac	132	Mon	.....	Bak	67
International H	2800	1550	Own	3½x5¼	19.6	L	C	Own	B	Ens	G	Bos	O	D	Own	3	A	Own	I	Own	7:1	25:1	.....	36x3	36x3½	Own	115	Own	Own	Fir	50
Marshall	....	895	Lyco	3¼x5	16.9	...	T	C	...	.....	.....	.....	...	H	Selec	3	U	.....	...	Flot	.....	.....	Cant	30x3½	30x3½	W	112	.....	Fir	Fir	....
Oldsmobile	2324	1250	Own	3 11x5¼	21.7	I	C	Own	B	Zen	V	AuL	L	C	Selec	3	U	Hart	I	Torb	6.5:1	38.87:1	S-El	35x5	35x5	W	128	.....	AuW	Jax	73
Rainier R11	2350	1750	Cont	3½x5	19.6	L	T	Har	...	Zen	V	Sim	...	D	B-Li	3	....	Hart	W	Timk	7.2:1	23.9:1	Per	34x4½	34x4½	Lav	125	Mon	Sch	Fir	80
Reo F	2525	1285	Own	4 3/8x4½	27.2	L	C	Own	S	John	G	Rem	R	O	Own	3	....	Own	B	Own	4.6:1	17.2:1	Penn	34x4½*	34x4½*	Own	128	.....	Pru	Fir	62.5
Shaw M-2	2400	1975	Cont	3¾x5	22.5	L	T	T	B	Zen	...	Bos	...	D	B-Li	3	U	Spic	G	Timk	.....	.....	Per	32x4*	32x4*	Gem	116	.....	.....	.....	65
Stewart 11	2190	1275	LeRoi	3⅛x4½	15.6	L	T	T	B	Zen	G	Eis	D	B	Durst	3	U	Hart	I	Cl	6:1	18.06:1	Det	32x4	32x4	CAS	110	.....	Wan	Fir	66.7
Texan	2500	1340	Lyco	3½x5	19.6	L	T	H	B	Cart	V	Del	D	B	GLee	3	....	UP	B	Flot	4.25:1	18.6:	S-El	33x4	33x4	CAS	112	.....	.....	Fir	60
White 15	2960	2400	Own	3¾x5 ½	22.5	L	C	C	B	Own	G	Mag	...	D	Selec	4	A	Own	B	Own	.....	.....	.....	34x4½*	34x4½*	Own	133	.....	.....	Fir	70
White Hickory E	....	....	Cont	3¾x5	22.5	L	C	T	B	Strm	...	Eis	...	F	Full	3	U	M&E	W	Timk	6.2:1	18.6:1	Shel	34x4½*	34x4½*	Lav	124	Simp	Bem	Fir	....
1 Ton															**1 Ton**																
Acason R	3650	2100	Wau	3¾x5¼	22.5	L	P	Can	S	Sheb	G	Eis	...	F	Full	3	U	Bld	W	Timk	8.25:1	33:1	Det	36x3½	36x5	Ross	142	Wau	Bim	.....	73
Acme B	3376	2075	Cont	3¾x5	22.5	L	T	GO	B	Rayf	V	Eis	G	B	Cott	3	U	Bld	W	Timk	7.75:1	31:1	Det	34x3½	34x5	Ross	130	Dup	Bim	.....	80
All-American A	2600	1595	H-Sp	3¼x5	16.9	L	T	Stan	B	Strm	G	Sim	...	B	GLee	3	....	UP	I	Torb	8:1	18:1	Det	33x4*	32x4	Ross	130	Pier	Stn	Gyd	75
Apex C	2870	1395	Buda	3½x5 ⅛	19.6	L	T	Can	P	Strm	V	AuL	Q	F	Full	3	U	UP	I	Torb	6.5:1	19.5:1	Det	33x4*	32x3½	Lav	130	.....	.....	Fir	70
Beck-Hawkeye A	2800	1650	Cont	3¾x5	22.5	L	T	Har	S	Strm	G	Bos	...	F	Full	3	....	Bld	I	Cl	6:1	2.5:1	Hig	34x3½	34x5	Lav	124	Pier	Hay	Fir	75
Belmont A	2000	1150	GBS	3¾x4¼	22.5	L	T	GO	S	Zen	G	Con	D	P	Selec	3	U	Ster	B	¾-Fl	5.25:1	15.75:1	S-El	31x4*	31x4*	Lav	113	.....	E&O	Stn	60
Bessemer G	2900	1600	Cont	3½x5	19.6	L	T	C	B	Zen	...	Bos	...	F	Full	3	....	Arv	I	Torb	.....	.....	Per	34x3½	34x4	Ross	124	.....	.....	.....	57
Briscoe T34	2958	1495	Own	3½x5	18.2	L	T	C	B	Buic	G	Bat	L	C	Own	3	U	UM	I	Russ	8.2:1	23.4:1	S-El	33x4	34x4	Lav	121	.....	Hay	Jax	....
Cameron D	....	2400	Own 6	3x4½	21.6	I	A	.....	B	Zen	...	.....	B	B	Selec	3	....	Ther	I	Torb	12:1	.....	Bran	36x6	36x6	.....	136	.....	.....	.....	....
Chevrolet T	2840	1325	Own	3 11x5¼	21.7	I	C	Har	B	Zen	...	Rem	L	C	Warn	3	...	Arv	W	½-Fl	.....	.....	Hess	33x4*	35x5*	Warn	125	Mon	.....	.....	....
Clydesdale 32X	3400	2185	Cont	3¾x5	22.5	L	T	T	S	Zen	G	Bos	...	L	B-Li	3	U	Spic	W	Stan	7.5:1	24:1	Stan	34x3½	34x5	Ross	144	Own	.....	.....	72
Collier 18	....	1650	Cont	.....	19.6	...	...	.....	S	.....	.....	.....	...	F	Full	...	.....	.....	W	Own	.....	.....	.....	34x4	34x5	.....	140	Mon	.....	.....	...
Columbia F	2800	1750	Cont	3¾x5	22.5	L	C	T	B	Shk	G	Dix	...	B	Covt	3	U	Spic	I	Russ	7.5:1	21:1	Per	34x3½	34x5	Own	125	Pier	StM	Fir	70
Commerce E	2900	1590	Cont	3¾x5	22.5	L	T	L	S	Zen	V	Eis	I	C	Selec	3	U	Spic	I	Torb	7:1	22.9:1	Det	35x5	35x5	Jac	126	.....	Bim	Fir	80
Conestoga 20	3300	2100	Cont	3½x5	19.6	L	T	EM	S	Strm	G	Sim	...	F	Full	3	U	Ster	W	Wis	7.75:1	23:1	S-El	34x3½	34x5	Ross	128	.....	E&O	Stn	90
Corbitt H	3250	2200	Cont	3¾x5	22.5	L	T	McC	B	Strm	V	Eis	...	D	B-Li	3	U	Spic	W	Shel	6.5:1	19.5:1	Shel	34x3½	34x4	Ross	130	Simp	Bim	Fir	75
Dart H	3200	2100	Buda	3¾x5 ½	22.5	L	T	C	F	Zen	V	Eis	...	F	Full	3	U	Spic	W	Own	7:1	20.3:1	Per	34x3½	34x5	Ross	130	Pier	Pru	.....	80
Day-Elder A	3250	1925	Cont	3½x5	19.6	L	T	Bus	B	Zen	G	Eis	...	D	Covt	3	U	Hart	W	Wis	7.75:1	28.3:1	Shel	34x3	34x4	Ross	128	.....	Jon	Stn	70
Diehl A	2400	1575	Cont	3½x5	19.6	...	T	H	B	Zen	G	Sim	...	B	Durst	3	....	K-B	1	Torb	5.33:1	3.5:1	Mar	34x4½*	35x5*	Jac	115	.....	Sch	Fir	90

Denby 12	3100	1950	Cont	3½x5	19.6	L	T	Lng	B	Strm	G	Eis	...	F	Full	3	U	[illegible]	I	Russ	8.2:1	26.2:1	Det	35x5	36x6	Ross	124	Mon	Hay	.....	73
Douglas C	2750	1700	Buda	3½x5½	19.6	L	T	Own	B	Sheb	V	Eis	...	F	Full	3	U	Arv	I	Torb	8:1	23:1	Own	34x4½	35x5	Ross	122	.....	Det	.....	65
Famous B-10	3000	1690	Cont	3½x5	19.6	L	T	T	S	Strm	V	Eis	...	F	Full	3	U	Bear	I	Cl	7:1	21:1	Det	36x3½	36x4	Ross	120	Mon	Bim	.....	75
Federal SD	3600	2400	Cont	3¾x5	22.5	L	C	T	F	Zen	V	Eis	...	B	Own	3	A	Pet	W	Timk	6.2:1	20.6:1	Math	35x5*	36x6*	Gem	132	Phar	Det	Det	71
Ford T	1450	550	Own	3¾x4	22.5	L	C	T	S	Own	G	Mag	...	D	Plan	2	U	Own	W	½-Fl	7.25:1	.....	.....	30x3½*	32x4½*	.....	124	.....	Smi	.....	.....
Forschler A	3450	2100	Cont	3½x5	19.6	L	C	Own	B	Zen	...	Bos	Q	F	Full	3	...	Hart	W	Shel	.....	.....	Own	36x3	36x4	Ross	120	Dup	.....	.....	.....
Gary F	3200	2100	Buda	3¾x5	22.5	...	C	T	F	Mas	G	Eis	...	F	Full	3	U	Bld	W	Timk	7.2:1	21.6:1	S-El	36x3½	36x4	Lav	130	Pier	Pru	Gdy	.....
Giant 15	2950	1950	Cont	3¾x5	22.5	L	T	Idl	B	Sheb	G	Eis	...	L	B-Li	3	U	Spic	W	Shel	7.8:1	29.97:1	Math	34x3½	34x5	Jac	138	.....	Wan	.....	94
Higrade A18	2900	2100	Cont	3½x5	19.6	L	T	Per	B	Zen	V	Sim	E	F	Full	3	U	Bld	W	Shel	7.75:1	22.75:1	Per	35x5	35x5	Lav	115	Dup	Det	Fir	66
Hoover 15B	2425	1625	Cont	3¾x5	19.6	L	P	Can	F	Sheb	V	Dix	...	F	Full	3	U	Acme	W	Shel	6.2:1	18.6:1	Shel	32x4	33x4½	Lav	120	.....	E&O	Fir	.....
Indepen't B, Dav'n't, Ia	2900	1550	Cont	3½x5	19.6	L	T	C	F	Strm	V	Bos	...	F	Full	3	U	Bld	C	Dead	8.2:1	.....	GC	34x4½*	36x6*	Lav	132	.....	Pru	Fir	75
Indepen't F, Y'ngst'n, O	3400	....	Cont	3¾x5	22.5	L	P	T	C	Sheb	G	Eis	...	F	Full	3	U	Ster	W	Wis	8.25:1	33:1	S-El	36x3½	36x5	Ross	140	Pier	.....	.....	85
International F	3000	1850	Own	3½x5¼	19.6	L	C	Own	B	Ens	G	Bos	O	D	Own	3	A	Own	I	Own	8:1	26.5:1	.....	36x3½	36x4	Own	128	Own	Own	Fir	50
Jones 31A	3400	1495	Cont	3½x5	19.6	L	P	C	F	Strm	G	Eis	...	B	GLee	3	U	Arv	I	Russ	8.33:1	22.5:1	Cham	34x3½	34x4	CAS	130	Pier	Pru	Fir	80
Kleiber AA	....	2400	Cont	3¾x5¼	22.5	...	..	.....	...	Strm	G	Bos	...	...	B-Li	..	A	.....	W	.....	7:1	23.52:1	.....	34x3½	34x5	Ross	130	.....	W&L	.....	..
Maccar S	3600	2400	Cont	3¾x5	22.5	L	C	Own	B	Strm	G	Eis	...	L	B-Li	3	U	Spic	W	Timk	6.33:1	20.64:1	Mer	34x4½	35x5*	Ross	138	.....	Sch	..	70
Menominee HT	....	2080	Cont	3¾x5	22.5	L	T	C	S	Strm	G	Eis	...	F	Selec	3	U	Spic	W	Timk	7:1	23.3:1	Tut	34x3½	34x5	Ross	130	Mon	Stn	Fir	80
Myers 60	2850	1545	Lyco	3½x5	19.6	L	T	C	B	Zen	G	Swi	...	D	MM	3	U	UM	W	Chic	7.5:1	30:1	C-C	34x3½	34x4	CAS	130	.....	E&O	.....	75
Napoleon 9	3200	1385	Vict	3½x5	19.6	I	T	T	F	Strm	G	Con	L	F	Full	3	U	UP	I	Cl	6:1	18:1	.....	35x5*	35x5*	Lav	133	.....	.....	Fir	65
Nash 2018	3400	1650	Own	3¾x5¼	22.5	L	C	T	F	Strm	G	Eis	...	B	Selec	3	U	Own	I	Celf	6.83:1	21.85:1	.....	34x3	34x4	Jac	130	Simp	AuW	.....	67.5
Nelson & LeMoon F1	2900	2250	Cont	4½x5¼	27.2	L	C	T	S	Strm	G	Bos	W	L	B-Li	3	U	Own	W	Timk	7:1	2:1	Tut	36x3½	36x5	Lav	...	Pier	Pru	Gdy	80
Noble A20	3200	....	Buda	3¾x5¼	22.5	L	C	T	...	Zen	G	Eis	...	F	Full	3	U	M&E	W	Shel	7.8:1	23.4:1	S-El	36x3½	36x4	Lav	148	Pier	Bim	Fir	85
Norwalk	1650	1595	Lyco	3½x5	22.5	L	T	C	S	Zen	...	Del	D	D	MM	3	....	UM	W	½-Fl	.....	.....	C-C	34x4*	34x4	CAS	130	.....	.....	.....	90
Ogden A1	3400	2095	Cont	3¾x5	22.5	L	T	T	B	Rayf	G	Bos	...	B	B-Li	3	U	Acme	W	Timk	7.75:1	11.18:1	Tut	36x3	36x4	Gem	136	Pier	Stn	.....	70
Old Hickory	3470	2175	Cont	3¾x5	22.5	L	T	T	F	Strm	V	Mag	...	B	Selec	3	U	Bld	W	½-Fl	7.75:1	23.1:1	S-El	36x3½	36x4	Lav	135	Pier	Stn	Fir	75
Patriot Revere	2800	1890	Cont	3¾x5	22.5	L	T	C	S	Strm	V	AtK	B	B	Covt	3	A	Ther	W	Emp	6:1	21.72:1	S-El	35x5	35x5*	W	128	Q	.....	Gdy	60
Piedmont O 4-30	3000	1785	Lyco	3½x5	19.6	L	T	Stan	F	Cart	V	Bat	D	B	Selec	3	U	Hart	W	Emp	1.97:1	4.32:1	S-El	33x4*	33x4	Dit	130	.....	.....	Fir	.....
Pioneer B	....	1590	Cont	3½x5	19.6	...	T	.....	...	Strm	...	Bos	...	...	B-Li	3	....	.....	W	Timk	.....	.....	.....	36x3	36x4	.....	132	.....	.....	.....	.....
Rainier R-9	2800	1875	Cont	3½x5	19.6	L	T	Har	B	Zen	...	Sim	...	D	B-Li	3	....	Hart	W	Shel	.....	.....	Per	32x3	32x4	Lav	125	Mon	Sch	.....	80
Republic 10	2875	1605	Cont	3¾x5	22.5	L	T	C	B	Strm	G	Eis	...	D	Full	3	U	Hart	I	Torb	7:1	20.9:1	S-El	34x3	34x4	Jac	124	Rug	Pru	Fir	.....
Royal	....	2400	Wis	3¼x5	16.9	...	C	T	T	...	Strm	...	Bos	Q	B	Own	3	....	Own	W	Timk	.....	.....	Mer	34x4	34x5	Ross	128	Mon	.....	.....	.....
Sandow G	3000	1895	Cont	3½x5	19.6	L	T	T	B	Strm	G	Eis	...	D	Full	3	U	Spic	W	Shel	7.8:1	23:1	GC	34x3½	34x5	Ross	120	.....	Stn	.....	70
Service 220	3470	2245	Buda	3½x5½	19.6	L	C	T	B	Strm	V	Eis	...	D	Selec	3	U	Arv	W	Timk	7.75:1	23.2:1	.....	34x3½	34x5	Ross	137	.....	Bim	.....	65
Signal F	4395	2650	Cont	4½x5¼	27.2	L	C	McC	B	Strm	G	Eis	...	L	B-Li	4	A	Spic	W	Timk	7.75:1	31:1	Det	34x3½	36x5	Ross	146	Pier	Hay	Gdy	75
Standard 56	3250	2250	Cont	3¾x5	22.5	L	P	Lng	S	Strm	G	Eis	...	D	B-Li	3	U	Spic	W	Timk	7.2:1	.....	S-El	34x3½	34x4	Ross	134	Mon	.....	Opt	75
Stewart 8	2820	1695	Cont	3½x5	19 6	...	T	T	B	Zen	G	Eis	...	B	Durst	3	U	Hart	I	Cl	6.8:1	21:1	Det	34x3½	34x4	Gem	130	.....	Wan	Fir	70
Superior D	2950	1600	Cont	3¾x5	19.6	L	T	Idl	B	Strm	V	Eis	...	F	Full	3	U	Arv	I	Torb	7:1	20.7:1	Tut	34x4½*	34x4	CAS	124	Pier	Sch	Fir	75
Transport 20	3070	1750	Cont	3¾x5	22.5	L	T	C	B	Strm	G	Eis	...	F	Full	3	U	Ther	I	Cl	7.25:1	21.75:1	Det	34x3½	34x4	Jac	130	Simp	.....	Fir	70
Vim 25	3700	2195	Her	3¾x5½	22.5	L	G	McC	F	Zen	G	Dix	...	L	B-Li	3	U	Spic	W	Shel	6.5:1	.....	Shel	35x5*	35x5*	Jac	125	.....	Hoo	Fir	.....

1¼ Ton

Garford 25	3900	2090	Buda	3¾x5½	22.5	L	C	T	S	Strm	G	Spl	...	L	.....	3	....	Spic	W	Timk	7.5:1	24:1	Per	34x3½	36x4	Ross	135	Mon	.....	.....	.....
Indiana 12	4000	2300	Own	3¾x5½	22.5	L	C	T	S	Strm	G	Eis	...	D	Selec	3	A	Acme	W	½-Fl	7.75:1	.....	S-El	34x3½	34x5	W	134	Wau	Bim	.....	65
Kissel Delivery	2950	1875	Own	3½x5½	24.1	L	C	Spar	S	Strm	V	Eis	...	W	Warn	3	U	Spic	B	Own	5:1	18.3:1	Math	34x4½*	34x4½*	Jac	135	Pier	Pru	Fir	68
Koehler C	3300	1885	H-Sp	3½x5	19.6	L	T	T	P	Zen	G	Eis	...	D	MM	3	U	Spic	I	Torb	7:1	23:1	Math	34x3	34x5	Own	132	Simp	Wan	SAE	75
Oneida A9	....	2150	Own	.....	22.5	L	C	.....	P	.....	...	Mag	...	...	Own	3	U	.....	...	Own	.....	.....	S-El	36x3½	36x5	W	135	Own	.....	.....	.....
Triangle AA	2500	....	Her	3¼x5	16.9	L	T	Per	B	Strm	G	NE	N	F	Full	3	U	UP	I	Cl	6:1	18:1	Det	35x5	35x5*	Gem	115	.....	Hay	.....	60

1½ Ton

Acason RB	3850	2300	Wau	3¾x5¼	22.5	L	P	Can	S	Sheb	G	Eis	...	F	Full	3	U	Bld	W	Timk	9.25:1	37:1	Det	36x3½	36x6	Ross	142	Wau	Bim	.....	77
Ace	4600	....	Buda	3¾x5½	22.5	L	T	Spi	F	Sheb	G	AtK	W	M	Cott	3	A	Spic	W	Timk	7:1	.....	Math	35x5*	38x7*	Ross	144	Pier	Sch	Gdy	80
Acme F	3700	2275	Cont	3¾x5	22.5	L	T	GO	B	Rayf	V	Eis	G	B	Cott	3	U	Bld	W	Timk	8.75:1	35:1	Det	34x3½	34x5	Ross	141	Dup	Bim	.....	80
Apex D	3070	1595	Buda	3½x5½	19.6	L	T	Can	P	Strm	V	AuL	Q	F	Full	3	U	UP	I	Torb	8:1	24:1	Det	32x3½	32x4	Lav	130	.....	.....	Fir	70
Atterbury 7R	4770	2575	Cont	4½x5¼	27.2	L	C	T	S	Zen	G	Eis	...	L	B-Li	4	U	Spic	W	Timk	8.5:1	34:1	SP	36x3½	36x5	Gem	140	Mon	Arc	Fir	96.5
Beck-Hawkeye B	3200	1950	Cont	3¾x5	22.5	L	C	H	S	Strm	G	Bos	...	F	Full	3	U	Bld	I	Cl	6:1	2.5:1	Hig	34x3½	36x6	Lav	144	Pier	.....	.....	75
Belmont B	3200	1950	Buda	3¾x5¼	22.5	L	P	GO	P	Zen	V	Eis	...	D	Selec	3	U	Ster	I	Russ	7.7:1	23:1	S-El	34x4½*	34x5	Lav	139	Pier	E&O	Stn	75
Bessemer H2	3650	2085	Cont	3¾x5	22.5	L	T	C	B	Zen	...	Bos	...	B	B-Li	3	....	Arv	I	Torb	.....	.....	Ter	36x3½	36x5	Ross	144	.....	.....	.....	63
Bethlehem D	3300	1965	Own	3¾x4½	22.5	L	T	Fed	B	Sheb	G	Bat	G	B	Det	3	U	UP	I	Russ	8.2:1	26.2:1	Shel	34x3½	34x5	Lav	136	Mon	Wan	Fir	85
Brockway S2	3550	2100	Cont	3¾x5	22.5	L	T	Bus	B	Strm	V	Eis	...	L	B-Li	3	U	Spic	W	Shel	7.8:1	26:1	Mer	36x3½	35x5	Gem	140	Opt	Hoo	.....	70
Chicago C1½	3800	2600	Her	3¾x5½	22.5	L	..	T	F	Strm	G	Bos	...	L	B-Li	3	U	Peters	W	Timk	7.25:1	25.8:1	Math	36x3½	36x5	Gem	144	Simp	Q	Stn	.....
Clydesdale 42	3750	2445	Cont	3¾x5	22.5	L	T	T	S	Zen	G	Bos	...	L	B-Li	3	U	Spic	W	Timk	7:1	23:1	Stan	36x3½	36x6	Ross	146	Own	.....	.....	72
Collier 19	4000	1850	Cont	.....	22.5	...	..	.....	...	.....	...	.....	...	...	.....	...	...	.....	...	.....	.....	.....	.....	36x4	36x6	.....	144	.....	.....	.....	.....
Comet 1½	2898	1750	Lyco	3½x5	19.6	L	T	Stan	B	Cart	G	Del	D	B	Munc	3	U	UP	W	Stan	.....	.....	Mar	34x4*	34x4	CAS	130	.....	.....	Fir	85
Commerce EP	3300	1965	Cont	3¾x5	22.5	L	T	L	S	Zen	V	Eis	I	C	Selec	3	U	Spic	I	Torb	7:1	22.9:1	Det	36x6*	36x6*	Jac	134	.....	Bim	Fir	80
Concord A	4200	2700	Buda	3¾x5½	22.5	L	C	T	S	Zen	G	Eis	...	L	B-Li	3	U	Spic	W	Timk	8.5:1	34:1	Per	36x3½	36x5	Ross	140	Mon	Arc	Fir	70
Corbitt D	3960	2600	Cont	3¾x5	22.5	L	T	McC	B	Strm	V	Eis	...	D	B-Li	3	U	Hart	W	Shel	8.66:1	26:1	Shel	36x3½	36x5	Ross	140	Simp	Bim	Fir	75
Dart S	3300	2250	Buda	3¾x5½	22.5	L	T	C	F	Zen	V	Eis	...	F	Full	3	U	Spic	W	Own	7:1	20.3:1	Per	34x3½	34x6	Ross	140	Pier	Pru	.....	80
Day-Elder B	3650	2200	Cont	3¾x5	22.5	L	T	Bus	B	Zen	G	Eis	...	D	Covt	3	U	Hart	W	Wis	9.33:1	34.1:1	Shel	34x3½	34x5	Ross	144	.....	Jon	Stn	72
Dearborn F	3280	1980	Cont	3½x5	19.6	L	T	T	S	Strm	V	Bos	...	F	Full	3	U	Arv	W	Stan	7.75:1	23.25:1	Tut	34x4	34x5	Lav	126	.....	.....	.....	80
Defiance B	3200	1795	Cont	3¾x5	22.5	L	T	T	Per	B	Strm	...	Eis	...	B	GLee	3	.....	Arv	I	Torb	.....	.....	Det	34x3½	34x5	Dit	135	Mon	.....	.....	85
Dependable C	4120	2150	**Buda**	3½x5¼	22.5	L	C	T	F	Zen	V	Dix	...	F	Full	3	U	Acme	W	Wis	8.25:1	12.25:1	Per	34x3½	34x5	Ross	128	Pier	Bim	Fir	70
Diamond T-Farm Spec.-T	5100	2295	.....	3¾x5¼	22.5	L	C	T	B	Strm	G	Bos	...	...	Selec	3	U	Ther	W	Timk	7.75:1	26.04:1	Math	36x3½	36x5	.....	144	....	.....	.....	.....
Diamond T-J4	3925	2755	.....	3¾x5	22.5	L	C	T	B	Strm	G	Bos	...	...	.....	3	U	Spic	W	.....	7.75:1	25.8:1	Math	36x3½	36x5	.....	154	Pier	.....	.....	.....
Douglas D	3100	2100	Buda	4½x5½	27.2	L	C	Own	B	Sheb	V	Eis	...	F	Full	3	U	Arv	I	Torb	8:1	23:1	Own	34x3½	34x5	Ross	127	Pier	.....	Gdy	65
Erie 1½	4700	....	Buda	3¾x5	22.5	L	C	McC	B	Strm	V	Bos	...	D	Full	4	U	Sher	W	Shel	.....	.....	Per	34x3½	36x5	Ross	144	Pier	Hoo	.....	80
Fageol 1½	3500	....	Lyco	3½x5	19.6	L	C	Spi	S	Till	G	.....	...	B	Selec	5	U	Spic	W	Stan	5.63:1	59.7:1	Math	34x3½	34x6	Ross	136	....	Pru	.....	80
Famous B-12	3600	2095	Cont	3¾x5	22.5	L	T	T	S	Strm	V	Eis	...	F	Full	3	U	Bear	I	Cl	7:1	21:1	Det	36x3½	36x5	Ross	138	Mon	Bim	.....	75
Federal TE	4250	2600	Cont	4½x5¼	27.2	L	C	T	B	Zen	G	Eis	...	B	Own	4	A	Spic	W	Timk	8.5:1	37.4:1	Math	36x3½	36x5	Gem	144	Phar	Sch	Fir	68.5
Forschler A-X	3670	2375	Cont	3½x5	19.6	L	C	Own	B	Zen	...	Bos	Q	F	Full	3	....	Hart	W	Shel	.....	.....	Own	36x3½	36x6	Ross	120	Dup	Smi	.....	.....
Gary GT	3800	2550	Buda	4 x5½	25.6	...	C	T	F	Mas	G	Eis	...	F	Full	3	U	Bld	W	Timk	7.25:1	21.75:1	S-El	36x3½	36x5	Ross	144	McC	Pru	Gdy	.....
Gersix M	4300	2650	Buda	4 x5½	25.6	L	C	T	I	F	Strm	V	Bos	...	B	Cott	3	U	Bld	W	Own	7.75:1	31:1	Tut	36x3½	36x6	Ross	142	Mon	Jon	.....	70
Giant 14	3600	2250	Cont	3¾x5	22.5	L	C	Idl	B	Sheb	G	Eis	...	L	B-Li	3	U	Spic	W	Shel	7.8:1	29.97:1	Math	34x3½	34x5	Jac	138	Pier	Wan	.....	94
G.M.C. 31A	4205	....	Cont	3¾x5	22.5	L	C	McC	P	Mar	G	Eis	...	D	Selec	4	U	Own	W	Timk	9.25:1	37.5:1	Det	36x3½†	36x5	Jac	130	Mon	Own	SAE	74
G.M.C. 31B	4245	....	Cont	3¾x5	22.5	L	C	McC	P	Mar	G	Eis	...	D	Selec	4	U	Own	W	Timk	9.25:1	37.5:1	Det	36x3½†	36x5	Jac	144	Mon	Own	SAE	74
Graham A	3400	2295	Cont	3¾x4	22.5	L	T	T	B	Strm	...	Eis	...	F	Full	3	....	K-B	I	Torb	.....	.....	.....	35x5*	36x6	Lav	133	Mon	.....	.....	80

1½ Ton—Continued

Model	Chassis Weight	Chassis Price	Engine—4 Cyl. unless otherwise noted	Bore and Stroke	Horsepower	Valve Arrange't	How Cooled	Radiator Make or Type	Lubrication	Carburetor	Fuel Feed	Ignition System	Engine Starter	Clutch	Transmission	Speeds Forward	Location of Transmission	Universal	Final Drive	Rear Axle	Total Gear Reduction in High	Total Gear Reduction in Low	Springs	Front Tires	Rear Tires	Steering Gear	Wheelbase	Governor	Wheels—Make	Rim Equipment	Pr. Cent of Weight on Rear Wheels
Gramm-Bernstein 15	3950	1995	Cont	3¾x5	22.5	L	T	T	S	Strm	G	NE	...	D	Selec	3	U	Own	I	Cl	7.22:1	21.6:1	.....	36x3½	36x5	Ross	138	.....	.....	Fir	....
Gramm-Bernstein 65	4200	2500	Cont	3¾x5	22.5	L	T	T	S	Strm	G	NE	...	D	Own	3	A	Own	W	Stan	7.22:1	26:1	.....	36x3½	36x5	Ross	138	.....	.....	Fir	....
Grant 10	3000	1885	Cont	3¾x5	22.5	L	T	Fed	B	Cart	V	Spl	R	B	GLee	3	U	Arv	I	Torb	7:1	.....	Per	34x4½*	34x5	Jac	124	.....	Bim	Fir	65
Grant 11	3100	1935	Cont	3¾x5	22.5	L	T	Fed	B	Cart	V	Spl	R	B	GLee	3	U	Arv	I	Torb	7:1	.....	Per	34x4½*	34x5	Jac	140	Pier	Bim	Fir	67
Hahn CD	4800	....	.....	4½x5	27.2	L	C	Own	F	Strm	...	Bos	...	D	B-Li	3	....	Spic	W	Timk	.....	.....	.....	36x3½	36x5	Ross	130	Pier	.....	.....	65
Harvey WEA	3850	2350	Buda	4½x5½	27.2	L	P	T	F	Zen	G	Bos	...	F	Full	3	U	Arv	W	Shel	7.75:1	23.25:1	Shel	34x3½	34x5	Ross	128	Mon	StM	.....	80
Hawkeye K	3750	1995	Buda	3¾x5½	22.5	L	P	C	B	Zen	G	Eis	...	F	Full	3	U	Hart	I	Cl	7.6:1	22.8:1	Det	34x3½	34x5	Ross	148	Simp	Bim	Fir	70
Higrade B 20	3300	2500	.....	4½x5	26	L	P	Per	B	Zen	V	Eis	E	F	Full	3	U	Bld	W	Shel	7.75:1	31:1	Per	36x6	36x6	Lav	130	.....	Det	Fir	66
Hoover 20A	3150	2150	Cont	3½x5	19.6	L	P	Can	F	Sheb	V	Dix	...	F	Full	3	U	Arv	W	Shel	7.8:1	23.4:1	Shel	34x4	34x5	Lav	132	Pier	E&O	Fir	....
Huffman B	3200	1895	Cont	3¾x5	22.5	...	T	C	F	Zen	G	Dix	I	F	Full	3	U	.....	W	Stan	8.67:1	8:1	Per	34x3½	34x6	Lav	140	.....	Roy	Fir	85
Huffman C	3350	1695	Buda	3¾x5½	22.5	...	T	C	F	Zen	G	Dix	I	F	Full	3	U	.....	W	Torb	12.17;1	11.5:1	Per	34x3½	34x6	Lav	140	.....	Roy	Fir	85
Hurlburt	4300	2850	Buda	4 x5½	25.6	L	C	Own	B	Flch	G	Eis	...	M	B-Li	3	.....	.....	W	Hind	.....	.....	Per	34x4	34x5	Ross	148	Dup	Wan	.....	85
Indepen't E. Dav'n't, Ia	3550	1890	Cont	3¾x5	22.5	L	C	C	B	Strm	V	Bos	...	F	Full	3	U	Bld	C	Dead	8.2:1	.....	GC	35x5*	38x7*	Lav	135	.....	Pru	Fir	75
International K	3400	2200	Own	3½x5¼	19.6	L	C	Own	B	Ens	G	Bos	O	D	Own	3	A	Own	I	Own	9:1	30:1	.....	36x3½	36x5	Own	128	Own	Own	Fir	50
Jumbo 15	3600	2595	Buda	3¾x5¼	22.5	L	P	T	...	Zen	G	N E	O	F	Full	3	U	Arv	I	Cl	7.2:1	4:1	Per	36x3½	36x5	Jac	144	.....	.....	.....	75
Kalamazoo G	4450	2600	Cont	3¾x5	22.5	L	P	Hvn	B	Strm	V	Con	N	F	Full	4	A	Acme	W	Wis	8.5:1	41:1	Shel	34x4	34x5	Ross	144	Pier	Bim	.....	....
Kelly-Springfield K31	4590	3000	Own	3¾x5¼	22.5	L	C	Fed	F	Zen	G	Eis	W	C	Covt	3	A	Own	C	Dead	8.66:1	31.58:1	Per	36x3½	36x6	Gem	144	Pier	StM	.....	89
Kelly-Springfield K32	4685	3000	Own	3¾x5¼	22.5	L	C	Fed	F	Zen	G	Eis	W	C	Covt	3	A	Spic	W	½-Fl	8.66:1	31.58:1	Per	36x3½	36x6	Gem	144	Pier	StM	.....	89
Kimball A	4500	3070	Wis	4 x6	25.6	L	C	Flex	B	Zen	V	Eis	...	L	B-Li	4	A	Spic	W	Shel	6.5:1	26:1	US	36x3½	36x5	Lav	144	Dup	Wes	.....	80
Kissel Utility	3890	2275	Own	3 7/8x5½	24.1	L	C	McC	S	Strm	V	Eis	...	W	Warn	3	U	Spic	W	Shel	7.8:1	28.5:1	Math	36x3½	36x5	Jac	152	Pier	Pru	.....	69
Kleiber A	.....	2800	Cont	4½x5¼	27.2	...	...	.....	...	Strm	G	Bos	...	...	B-Li	..	A	.....	W	.....	7:1	28:1	.....	36x3½	36x6	Ross	143	.....	W&L	.....	....
Larrabee-Deyo U	3600	2250	Cont	3¾x5	22.5	L	C	Bus	S	Sheb	G	Bos	...	L	B-Li	3	U	M&E	W	Shel	7.66:1	25.5:1	Mer	34x3½	34x5	Ross	138	Pier	Hoo	.....	....
Maccar L	4300	2750	Cont	4½x5¼	27.2	L	C	Own	B	Strm	G	Bos	...	L	B-Li	3	U	Spic	W	Timk	7:1	23.52:1	Mer	36x4	36x5	Ross	150	Pier	Sch	Gdy	70
Mack AB	4800	3000	Own	4 x5	25.6	L	C	Own	S	Zen	G	Aer	...	L	B-Li	4	U	Bld	C	Own D	6.99:1	28:1	Mer	36x4	36x3½†	Gem	144	Own	Sch	.....	68
Mack AB	4900	3000	Own	4 x5	25.6	L	C	Own	S	Zen	G	Aer	...	L	B-Li	4	U	Spic	W	Timk	8.53:1	34.09:1	Mer	36x4	36x3½†	Gem	144	Own	Sch	.....	68
Master JW	3800	2390	Buda	4½x5½	27.2	L	C	T	S	Mas	G	Eis	...	D	Full	3	U	Spic	W	Timk	7.75:1	23.25:1	Det	34x3½	34x5	Ross	142	McC	Pru	.....	78
Master JI	3900	2490	Buda	4½x5½	27.2	L	C	T	S	Mas	G	Eis	...	D	Full	3	U	Spic	I	Torb	8:1	24:1	Det	34x3½	34x5	Ross	142	McC	Pru	.....	78
Maxwell	2385	1185	Own	3½x4½	21	L	T	T	B	John	G	AtK	...	C	Selec	3	U	Own	W	½-Fl	7.25:1	34.4:1	Shel	32x3	32x4	Own	124	.....	Kel	Fir	50
Maxwell	2385	1205	Own	3½x4½	21	L	T	T	B	John	G	AtK	...	C	Selec	3	U	Own	W	½-Fl	7.25:1	34.4:1	Shel	32x3	32x4	Own	124	.....	Kel	Fir	50
Maxwell	2385	1225	Own	3½x4¼	21	L	T	T	B	John	G	AtK	...	C	Selec	3	U	Own	W	½-Fl	7.25:1	34.4:1	Shel	34x4½*	34x4½*	Own	124	.....	Kel	Fir	50
Maxwell	2385	1287	Own	3½x4½	21	L	T	T	B	John	G	AtK	...	C	Selec	3	U	Own	W	½-Fl	7.25:1	34.4:1	Shel	34x4½*	34x5	Own	124	.....	Kel	Fir	50
Maxwell	2385	1350	Own	3½x4½	21	L	T	T	B	John	G	AtK	...	C	Selec	3	U	Own	W	½-Fl	7.25:1	34.4:1	Shel	35x5	35x5	Own	124	.....	Kel	Fir	50
Menominee H	...	2725	Cont	3¾x5¼	22.5	L	C	C	S	Strm	G	Eis	...	F	Selec	3	U	Spic	W	Timk	9.25:1	23.3:1	Tut	36x3½	36x5	Ross	144	Mon	Stn	Fir	80
Moreland 20B	4150	2930	Cont	4½x5¼	27.2	L	C	Own	B	Mill	G	Dix	...	D	Selec	4	A	Ther	W	Timk	7:1	33.88:1	US	36x3½	36x5	Ross	126	.....	Smi	SAE	....
Myers 80	3000	1875	Lyco	3½x5	19.6	L	T	C	S	Zen	G	Swi	...	B	GLee	3	U	UM	W	Chic	8.5:1	32:1	C-C	34x3½	34x5	CAS	144	.....	E&O	.....	75
Napoleon 11	3450	1660	Vict	3½x5	19.6	I	T	T	F	Strm	G	Con	L	F	Full	3	U	UP	I	Cl	8:1	24:1	S-El	35x5*	36x6*	Lav	133	.....	.....	Fir	65
Nelson & LeMoon F1½	3400	2425	Cont	4½x5¼	27.2	L	C	T	S	Strm	G	Bos	W	L	B-Li	3	U	Own	W	Timk	7:1	2:1	Tut	36x3½	36x6	Lav	..	Pier	Pru	Gdy	80
Noble B-30	4200	....	Buda	3¾x5¼	22.5	L	T	T	...	Strm	G	Eis	...	F	Full	3	U	M&E	W	Shel	7.75:1	31.1:1	S-El	36x3½	36x5	Lav	156	Pier	Bim	Fir	85
Norwalk	1850	1925	Lyco	3½x5	19.6	L	T	C	B	Zen	...	Del	...	B	GLee	3	....	UM	W	Stan	.....	.....	C-C	34x3½	34x5	CAS	130	....	.....	.....	75
O.K. 1½ T	....	2450	Buda	4½x5½	27.2	L	P	C	B	Zen	...	Eis	...	F	Full	3	.....	.....	W	Wis	.....	.....	Tut	36x3½	36x5	Ross	146	Pier	.....	.....	....
Old Reliable A	4150	2350	Wis	4 x5	25.6	L	P	C	B	Strm	V	Bos	Q	M	B-Li	3	U	Spic	W	Shel	7.75:1	26:1	Shel	34x3½	36x6	Ross	138	Pier	StM	.....	90
Oneida B9	...	2550	Own	.....	25.6	L	C	T	P	.....	...	Mag	...	D	Own	3	A	.....	...	Own	.....	.....	S-El	36x3½	36x6	.....	144	Own	.....	.....	....
Packard 1½E	4670	3200	Own	4 x5½	25.6	L	C	C	F	Own	P	Dix	B	D	Selec	4	A	Spic	W	Flot	6.25:1	28.7:1	.....	34x3½	34x3½†	Own	144	Own	.....	.....	46.2
Patriot Lincoln	3900	2650	Hink	4 x5¼	25.6	L	T	Own	F	Strm	V	.....	...	D	Selec	4	A	Ther	W	Emp	7.25:1	34.8:1	S-El	34x3½	34x3½†	W	140	.....	.....	Gdy	75
Piedmont	3000	1785	Lyco	3½x5	19.6	L	T	Stan	F	Cart	V	Bat	D	B	Selec	3	U	Hart	W	Emp	1.97;1	4.32:1	S-El	.....	.....	Dit	140	.....	.....	Fir	....
Pioneer N	....	1990	Cont	3¾x5	22.5	...	C	.....	...	Strm	...	Bos	...	...	B-Li	3	....	.....	W	Timk	.....	.....	.....	36x3½	36x5	.....	154	.....	.....	.....	....
Rainier R-6	3100	1975	Cont	3½x5	19.6	L	T	C	Har	B	Zen	V	Sim	...	D	B-Li	3	U	Hart	W	Shel	7.8:1	25.97:1	Per	34x3	34x4	Lav	133	Mon	Sch	.....	80
Reliance A10	4500	2500	Buda	4 x5½	25.6	L	T	H	B	Strm	G	Eis	...	F	Full	3	U	Peters	E	Badg	6.6:1	19.8:1	Shel	36x3½	36x5	Ross	150	Pier	Bim	Gdy	90
Republic 11X	3365	2050	Cont	3¾x5	22.5	L	T	C	B	Strm	G	Eis	...	D	Full	3	U	Hart	I	Torb	8:1	23:1	S-El	34x3½	34x5	Jac	144	Rug	Pru	Fir	....
Reynolds 1½	....	3050	.....	4x5¼	25.6	L	C	Own	F	Strm	G	Mag	...	..	Own	4	A	.....	W	Own	7.75:1	36.81:1	S-El	36x3½	36x6	Own	144	Hink	Smi	.....	....
Rowe CW	.....	2800	Wis	3¾x5	22.5	L	C	Fed	F	Zen	G	Bos	...	L	B-Li	4	U	Spic	W	Shel	.....	.....	Shel	36x6*	36x6*	Ross	...	Simp	Hoo	.....	....
Royal	....	2800	Wis	3¾x5	22.5	...	C	T	...	Strm	...	Bos	Q	D	Own	...	....	Own	W	Timk	.....	.....	Mer	34x4	34x5	Ross	128	.....	.....	.....	67
Sandow CG	3300	2190	Cont	3¾x5	22.5	L	T	T	B	Strm	G	Eis	...	D	Full	3	U	Spic	W	Shel	7.8:1	23:1	GC	34x3½	34x5	Ross	135	.....	Stn	.....	70
Schwartz	3500	2175	Cont	3¾x5	22.5	L	T	Fed	B	Strm	G	Bos	...	L	B-Li	3	....	Hart	I	Torb	.....	.....	Row	34x3½	34x5	Ross	140	Pier	.....	.....	....
Schwartz B	3500	2375	Cont	3¾x5	22.5	L	T	Fed	B	Strm	G	Bos	...	L	B-Li	3	U	Hart	I	Torb	7.6:1	25.5:1	Row	36x8*	36x8*	Ross	140	Pier	Sch	.....	....
Selden 1½A	3400	2240	Cont	3¾x5	22.5	L	T	Bus	B	Strm	G	Bos	N	L	B-Li	3	U	Spic	W	Timk	7.75:1	.....	Per	34x3½	34x5	Lav	140	Pier	Arc	Gdy	70
Service 31	4850	2785	Buda	4 x5½	25.6	L	C	T	F	Strm	G	Eis	...	D	Selec	4	A	Spic	W	Timk	7.75:1	37.5:1	.....	36x3½	36x6	Ross	150	Simp	Bim	.....	65
Service 36	4900	3215	Buda	4½x5½	28.9	L	C	T	F	Strm	G	Eis	...	D	Selec	4	A	Spic	W	Timk	6.8:1	32.9:1	.....	35x5*	38x7*	Ross	150	Simp	Bim	.....	65
Signal H	4670	2850	Cont	4½x5¼	27.2	L	C	McC	B	Strm	G	Eis	...	L	B-Li	4	A	Spic	W	Timk	9.25:1	37:1	Det	34x4	36x6	Ross	146	Pier	Hay	Gdy	75
Sterling 1½	4720	2850	Ster	4 x5¾	25.6	L	C	Own	P	Ray	V	Eis	...	L	B-Li	4	U	Spic	W	Timk	7:1	28:1	Math	36x3½	36x5	Ross	142	Wan	Wan	.....	91
Stewart 9	3440	2095	Cont	3¾x5	22.5	L	T	T	B	Zen	G	Eis	...	F	Full	3	U	Hart	I	Cl	7.6:1	22.8:1	Det	34x3½	34x5†	Gem	140	.....	Wan	Fir	70
Stoughton B	.....	.....	.....	3¾x5¼	22.5	...	C	Own	B	Strm	G	Eis	...	D	B-Li	3	U	.....	W	Shel	7.5:1	.....	S-El	36x3½	36x5	.....	140	.....	Own	Gdy	..
SullivanF	3500	2350	Buda	3¾x4½	22.5	L	T	V	F	Strm	G	Bos	...	H	Covt	3	A	Hart	W	Timk	8.50:1	31:1	Mer	36x3½	36x5	Ross	129	.....	Wan	.....	60
Texan TK39	3200	1425	Lyco	3½x5	19.6	L	T	H	B	Cart	V	Del	D	B	Munc	3	U	UP	W	½-Fl	7.75:1	20 15:1	S-El	34x4	34x4	CAS	130	.....	.....	Fir	60
Tiffin GW	3750	2415	Cont	4½x5¼	27.2	L	T	V	B	Sheb	G	Bos	...	F	Full	3	U	Hart	W	Shel	7.75:1	23.25:1	Kal	36x3½	36x5	Ross	129	Pier	Smi	.....	....
Tower J1½	3900	2700	Cont	4½x5¼	27.2	L	C	T	B	Strm	...	Bos	...	F	Full	3	....	Spic	W	Timk	.....	.....	Det	35x5*	38x7*	Ross	142	Pier	.....	.....	....
Transport 30	3450	2050	Cont	3¾x5	22.5	L	C	C	B	Strm	G	Eis	...	F	Full	3	U	Hart	I	Cl	7.6:1	30.2:1	Det	36x3½	36x5	Jac	140	Simp	.....	Fir	70
Triangle A	3750	2185	Wau	3¾x5¼	22.5	L	C	Per	L	Strm	G	Eis	...	F	Full	3	U	UP	I	Cl	6.83:1	21:1	Det	34x3½	34x6	Gem	144	Wau	Roy	Fir	60
Triumph H	3650	2450	Buda	3¾x5¼	22.5	...	C	H	F	Bent	V	Dix	...	B	Cott	3	U	Hart	...	Ruse	.....	.....	S-El	36x3½	36x6	Lav	144	Pier	Stn	Fir	80
United A	.....	2100	Buda	3¾x5½	22.5	L	C	V	F	.....	G	Eis	Q	L	B-Li	3	U	Bld	I	Cl	7:1	.....	.....	34x3½	34x5	Ross	Q	Simp	Pru	Fir	80
U. S., N	3800	2250	Cont	3¾x5	22.5	L	C	T	S	Strm	V	Eis	Q	D	B-Li	3	U	Q	I	Cel	7.6:1	25.3:1	Shel	36x3½	36x5	Lav	144	Mon	Sch	.....	85
U. S., N. W	3900	2650	Cont	3¾x5	22.5	L	C	T	S	Strm	V	Eis	Q	D	B-Li	3	U	Q	W	Shel	7.8:1	25.97:1	Shel	36x3½	36x5	Lav	144	.....	Sch	.....	85
Velie 46	3650	1925	Cont	3¾x5	22.5	L	C	T	B	Strm	G	Bos	...	B	Durst	3	U	Arv	I	Torb	8:1	31.2:1	Math	36x3½	36x5	Gem	133	.....	Bim	Gdy	80

White Hickory H.	3975	2575	Cont	3¾x5	22.5	L	C	T	B	Strm	V	Eis	...	F	Full	3	U	Arv	W	Timk	8.5:1	25.5:1	Shel	36x3½	36x5	Ross	144	Simp	Bim	Fir	76
Wichita L.	3600	2350	Own	3½x5	19.6	L	C	T	Per	S	Strm	G	Ber	...	C	Covt	3	A	Own	W	Shel	7.75:1	28.4:1	.....	36x3½	36x5	Ross	144	.....	Bim	Fir	80
Wilson F.	3800	2450	Cont	3¾x5	22.5	L	C	T	B	Mar	G	Eis	...	B	B-Li	4	A	Ther	W	Timk	6:1	24:1	Perf	36x3½	36x5	Ross	136	Pier	.....	.....	75
Winther 39.	3700	2325	Wis	3¾x5	22.5	L	P	T	G	Strm	G	Eis	W	F	Full	3	U	Arv	I	Cl	7:1	21:1	Har	34x3½	34x5	Lav	140	.....	Own	Fir	70
Winther 430.	4100	2575	Wis	3¾x5	22.5	L	P	T	G	Strm	G	Eis	W	F	Full	3	U	Arv	I	Cl	9:1	36:1	Har	32x4	32x4	Lav	132	.....	Own	Fir	70
Witt-Will N.-P.	3550	2000	Cont	3¾x5¼	22.5	I	G	C	B	Zen	G	Eis	...	D	Selec	3	U	Spic	W	Timk	6:1	25:1	S-El	36x3½	36x4	Ross	120	Pier	Arc	SAE	67
Wolverine C.	3400	2380	Cont	3¾x5	22.5	L	T	L	B	Strm	G	Mag	G	F	Selec	3	U	UP	I	Russ	8.2:1	32.8:1	Tut	34x3½	34x5	Gem	140	Mon	Hay	Gdy	77

2 Ton

Acme A	4450	2875	Cont	4⅛x5¼	27.2	L	C	GO	B	Rayf	V	Eis	...	B	Cott	4	U	Bld	W	Timk	8.5:1	44:1	Det	36x4	36x7	Ross	148	Dup	Bim	.....	80
Autocar F	3430	2300	Own 2	4¾x4½	18	L	C	V	S	Strm	G	Mag	...	D	Prog	3	A	.....	R	Flot	8.3:1	33.2:1	.....	34x4	34x5	Own	97	.....	Hoo	.....	65
Autocar G.	3690	2400	Own 2	4¾x4½	18	L	C	V	S	Strm	G	Mag	...	D	Prog	3	A	.....	R	Flot	8.3:1	33.2:1	.....	34x4	34x5	Own	120	.....	Hoo	.....	65
Available H2.	4600	3050	Cont	4⅛x5¼	27.2	L	C	T	B	Strm	V	Bos	...	L	B-Li	4	A	Spic	W	Timk	7.75:1	31:1	Tut	36x4	36x7	Ross	152	Pier	Sch	.....	90
Beck Hawkeye C.	4000	2350	Cont	4⅛x5¼	27.2	L	P	H	F	Strm	G	Bos	...	F	Full	3	U	Bld	I	Cl	9:1	2:1	Hig	36x4	36x7	Lav	144	Pier	Hay	Fir	70
Belmont C.	4300	2550	Buda	4¼x5½	28.9	L	P	GO	P	Zen	V	Eis	...	D	Selec	3	U	Ster	I	Russ	8:1	24:1	S-El	36x4	36x7	Lav	150	Pier	E&O	Stn	75
Collier 20.	.....	2150	.....	.....	22.5	...	..	.....	B	.....	..	.....	...	..	.....	..	..	.....	W	Own	.....	.....	.....	.....	.....	.....	152	.....	.....	.....	.....	.....
Conestoga 30.	4000	2700	Cont	3¾x5	22.5	L	T	EM	S	Strm	G	Sim	...	F	Full	3	U	Ster	W	Wis	9.66:1	29:1	S-El	36x4	36x4†	Ross	138	Mon	E&O	Stn	80
Corbitt C.	4800	3250	Cont	4⅛x5¼	27.2	L	C	McC	B	Strm	V	Eis	...	D	B-Li	3	U	Hart	W	Shel	8.75:1	29.4:1	Shel	36x3½	36x7	Ross	148	Simp	Bim	Fir	75
Day-Elder D.	4300	2600	Cont	4⅛x5¼	27.2	L	C	Bus	B	Zen	G	Eis	...	D	Covt	3	U	Hart	W	Wis	9.67:1	35 4:1	Shel	36x4	36x6	Ross	144	Mon	Jon	Stn	72
Dearborn BW.	3000	2250	Buda	3¾x5⅛	19.6	L	T	T	S	Strm	V	Bos	...	B	GLee	3	U	Hart	W	Stan	7.75:1	23.8:1	S-El	32x4*	34x5	Dit	133	.....	.....	.....	90
Dearborn 48.	3500	2390	Buda	3¾x5⅛	19.6	L	T	T	B	Strm	V	Bos	...	F	Full	3	U	Hart	W	Stan	8.66:1	29.5:1	S-El	34x4½*	34x7	.....	148	.....	.....	.....	85
Defiance C.	3500	1995	Cont	3¾x5	22.5	L	T	Per	B	Strm	...	Eis	...	B	GLee	3	....	Arv	I	Torb	.....	.....	Det	34x3½	34x6	Dit	135	Mon	.....	.....	85
De Kalb E2.	4150	2100	Cont	4⅛x5¼	27.2	L	P	T	F	Mas	G	Eis	...	F	Full	3	U	K-B	W	Timk	8.5:1	28:1	Math	34x3½	34x6	Ross	146	.....	Hay	.....	68
Denby 134.	3800	2450	Cont	3¾x5	22.5	L	T	Lng	S	Strm	G	Eis	...	F	Full	4	U	UP	I	Russ	10.2:1	49:1	Det	36x3½	36x6	Ross	144	Mon	Hay	.....	75.5
Diamond T-J3.	4335	3185	.....	4⅛x5¼	27.2	L	C	T	B	Strm	G	Bos	...	..	.....	3	U	Spic	W	.....	7.75:1	26.04:1	Math	36x4	36x7	.....	154	Pier	.....	.....	.....
Dorris K-4.	5050	3285	Own	4¼x5½	28.9	I	C	T	F	Strm	G	Bos	...	D	Warn	4	A	Spic	W	Timk	7.75:1	38.67:1	Row	36x4	36x7	Ross	162	Own	Smi	.....	70
Erie 2.	5100	....	Buda	4¼x5½	28.9	L	C	McC	B	Strm	G	Bos	...	D	Full	4	A	Spic	W	Shel	.....	.....	Per	34x3½	36x5	Ross	150	Pier	Hoo	.....	80
Evans C-I.	4400	2800	Cont	4⅛x5¼	27.2	L	G	T	B	Strm	...	Berl	D	D	Cott	4	A	Acm	I	.....	7:1	40:1	.....	36x4	36x8	Lav	168	Mon	Smi	Stn	82
Fargo P.	3900	2200	Cont	3¾x5	22.5	L	T	Own	S	Rayf	G	Bos	...	D	Full	4	U	Spic	I	Russ	9.5:1	.....	Shel	36x4	36x6	Jac	144	.....	.....	.....	80
Federal UE.	4800	2900	Cont	4⅛x5¼	27.2	L	C	T	B	Zen	G	Eis	...	B	Own	4	A	Spic	W	Timk	9.25:1	40.7:1	Math	36x4	36x7	Gem	156	Phar	Sch	Fir	71.5
Forschler B.	4425	2750	Cont	4⅛x5¼	27.2	L	C	O	B	Zen	...	Bos	Q	F	Full	3	....	Hart	W	Shel	.....	.....	Own	36x4	36x7	Ross	137	Dup	Smi	.....	.....
Fulton C.	3300	2350	H-Sp	3¼x5	16.9	L	T	GO	B	Cart	C	Sim	...	B	Durst	3	....	UP	I	Russ	.....	.....	S-El	34x4	34x6	Lav	137	.....	.....	.....	68
Gabriel E.	5000	3250	Buda	4¼x5½	28.9	L	C	T	F	Rayf	G	Bos	L	B	B-Li	4	A	Spic	W	Timk	8.5:1	1:1	Mer	35x5	36x7	Gem	156	Dup	Smi	Fir	65
Garford 70H.	4590	3190	Buda	4¼x5½	28.9	L	C	T	F	Strm	G	Spl	...	W	Selec	4	A	Spic	W	Timk	7.75:1	.....	Per	36x4	36x7	Ross	144	Simp	.....	.....	.....
Giant 16.	4500	2850	Cont	4⅛x5¼	27.2	L	P	Own	B	Sheb	G	Eis	...	L	B-Li	3	U	Spic	W	Shel	8.66:1	29.09:1	Math	36x4	36x7	Ross	168	Pier	Wan	.....	90
G.M.C. 41A.	4855	....	Cont	4⅛x5¼	27.2	L	C	McC	P	Mar	G	Eis	...	D	Selec	4	U	Own	W	Timk	9.25:1	37.5:1	Det	36x4	36x7	Jac	144	Mon	Own	SAE	74
G.M.C. 41B.	4910	....	Cont	4⅛x5¼	27.2	L	C	McC	P	Mar	G	Eis	...	D	Selec	4	U	Own	W	Timk	9.25:1	37.5:1	Det	36x4	36x7	Jac	158	Mon	Own	SAE	74
Gramm-Bernstein 20.	5050	2900	Cont	4⅛x5¼	27.2	L	C	T	S	Strm	G	NE	...	D	Own	4	A	Own	W	Shel	7.75:1	28:1	.....	36x4	36x7	Ross	144	Pier	.....	Fir	.....
Grant 15.	3400	2150	Cont	3¾x5	22.5	L	T	Fed	B	Cart	V	Spl	R	B	GLee	3	U	Arv	I	Torb	8:1	.....	Per	34x4	34x6	Jac	124	Pier	Bim	.....	67
Grant 16.	3500	2250	Cont	3¾x5	22.5	L	T	Fed	B	Cart	V	Spl	R	B	GLee	3	U	Arv	I	Torb	8:1	.....	Per	34x4	34x6	Jac	149	Pier	Bim	.....	70
Hahn DE.	4300	.....	.....	4½	27.2	L	C	Own	F	Strm	...	Bos	...	D	B-Li	3	...	Spic	W	Shel	.....	.....	.....	36x4	36x6	Ross	142	Pier	.....	.....	.....
Hall.	4560	2875	Cont	4⅛x5¼	27.2	L	P	H	B	Zen	G	Bos	...	L	B-Li	..	U	K-B	W	Timk	7.75:1	.....	Det	36x4	36x8	Gem	Q	Dup	Smi	.....	.....
Hawkeye M.	4500	2650	Buda	4¼x5½	28.9	L	C	C	B	Zen	G	Eis	...	F	Full	4	U	Hart	I	Cl	9:1	43.2:1	Det	36x4	36x6	Ross	148	Simp	Bim	Fir	70
Hewitt-Ludlow.	4200	2950	Buda	4⅛x5½	27.2	...	..	T	...	Strm	...	Bos	...	B	Cott	..	..	Spic	W	Wis	.....	.....	.....	36x4	36x6	Ross	140	.....	.....	.....	.....
H & M 2.	3400	2250	Her	3½x5	29.5	...	T	GO	B	Cart	G	Bos	D	F	Full	4	U	Ther	I	Torb	Opt	Opt	Math	36x6*	38x7*	Lav	144	.....	.....	Fir	75
Indepen't F, Dav'n't, Ia.	4500	2290	Cont	4⅛x5¼	27.2	L	C	C	B	Strm	V	Bos	...	F	Full	4	U	Bld	C	Dead	10.2:1	.....	G-C	36x6*	40x8*	Lav	146	.....	Pru	Fir	75
Indepen't K, Y'ngst'n, O.	5400	...	Cont	4½x5½	32.4	L	C	T	T	Sheb	G	Eis	...	F	Full	4	U	Spic	W	Wis	10:1	48:1	S-El	36x5	36x10	Ross	160	Pier	.....	.....	85
Indiana 20.	5300	2950	Own	4⅛x5½	27.2	L	C	T	F	Strm	G	Eis	...	D	Selec	4	A	Acme	W	½-Fl	7.75:1	.....	S-El	36x4	36x7	Wohl	150	.....	Bim	.....	68.5
International G.	4010	2600	Own	4 x5	25.6	I	T	Own	B	Ens	V	Dix	O	D	Own	3	A	Gwn	I	Own	9:1	30:1	.....	36x4	36x6	Own	138	Own	Own	Fir	50
Jumbo 20.	3750	2795	Buda	3¾x5¼	22.5	L	P	Own	T	Zen	G	N E	N	F	Full	3	U	Arv	I	Cl	7.6:1	4:1	Per	35x5*	38x7*	Jac	144	.....	.....	.....	75
Kalamazoo H.	5350	3200	Cont 6	3½x5¼	29.4	L	P	Hvn	B	Strm	V	Bos	D	B	Full	4	A	Acme	W	Wis	8.75:1	40.8:1	Shel	34x4	36x7	Ross	160	Pier	Bim	.....	.....
Keldon 19.	5100	2885	Buda	4¼x5½	28.9	L	C	Eur	F	Strm	G	Eis	...	F	Full	4	U	Det	I	Russ	1.75:1	3.75:1	.....	36x4	36x7	Ross	144	Pier	Smi	Fir	80
Keystone 40.	4000	2350	Buda	3¾x5⅛	22.5	L	T	McC	B	Zen	G	Ber	...	F	Full	3	U	Spic	I	Russ	8.88:1	26.6:1	Row	35x5*	38x7*	Dit	144	Pier	Hoo	Gdy	75
Kimball B.	**4900**	**3675**	**Wis**	**4 x6**	**25.6**	**L**	**C**	**Flex**	**B**	**Zen**	**V**	**Eis**	...	**L**	**B-Li**	**4**	**A**	**Spic**	**W**	**Shel**	**65:1**	**26:1**	**U.S.**	**36x4**	**36x7**	**Ross**	**Q**	**Dup**	**Smi**	.....	**80**
King Zeitler.	4600	2950	Cont	4⅛x5¼	27.2	L	C	T	B	Strm	G	Bos	...	L	B-Li	4	A	Ther	W	Timk	7.75:1	37:1	Tut	36x4	36x7	Lav	150	.....	StM	SAE	80
Kissel Freighter.	4910	2975	Own	4¼x5½	28.9	L	C	McC	S	Strm	V	Eis	...	W	Warn	4	A	Spic	W	Timk	8.5:1	42.5:1	Math	36x4	36x7	Lav	168	Pier	Pru	.....	76
Kleiber BB.	....	3200	Cont	4⅛x5¼	27.2	...	..	.....	...	Strm	G	Bos	...	..	B Li	..	A	.....	W	.....	8.66:1	31:1	.....	36x4	36x7	Ross	153	.....	W&L	.....	.....
Lange B.	5200	3000	Cont	4⅛x5¼	27.2	L	T	H	S	Strm	...	Bos	...	D	Cott	3	....	Hvn	C	Own	.....	.....	.....	36x4	36x6	Gem	136	Pier	.....	.....	90
Luedinghaus A.	4300	2490	Wau	4¼x5¾	28.9	L	G	T	B	Sheb	...	Mag	...	G	Det	3	U	Spic	W	Chi	8.66:1	26.6:1	Tut	36x4	36x7	Lav	145	Wau	Own	SAE	80
Luverne BBL.	....	1650	GBS	3¾x4¼	22.5	L	T	C	S	Sheb	G	Bos	D	D	Det	3	U	UP	I	Flot	8:1	30:1	Har	34x4*	34x5	Lav	136	.....	Own	Fir	.....
Mack AB.	4900	3300	Own	4 x5	25.6	L	C	Own	S	Zen	G	Aer	...	L	B-Li	4	U	Bld	C	OwnD	6.99	28.01	Mer	36x4	36x4†	Gem	144	Own	Sch	.....	71
Mack AB.	5000	3300	Own	4 x5	25.6	L	C	Own	S	Zen	G	Aer	...	L	B-Li	4	U	Spic	W	Timk	8.5:1	34.09:1	Mer	36x4	36x4†	Gem	114	Own	Sch	.....	71.5
Marshall 2.	....	1750	.....	3½x5	29.4	L	T	.....	...	.....	..	**Mag**	...	**B**	**Selec**	**3**	**U**	.....	W	.....	.....	.....	**S-El**	**34x5**	**34x5**	**W**	**132**	.....	.....	.....	.....
Master M.	4300	2890	Buda	4¼x5½	28.9	L	C	T	B	Mas	G	Eis	...	D	B-Li	4	U	**Spic**	I	Torb	8:1	32:1	Det	34x4	36x7	Ross	144	McC	Pru	.....	76
Master O.	4400	2990	Buda	4¼x5½	28.9	L	C	T	B	Mas	G	Eis	...	D	B-Li	4	U	**Spic**	I	Torb	8:1	32:1	Det	34x4	36x7	Ross	170	McC	Pru	.....	76
Master T.	4500	3050	Buda	4¼x5½	28.9	L	C	T	B	Mas	G	Eis	...	D	B-Li	4	U	Spic	I	Torb	8:1	32:1	Det	34x4	36x4†	Ross	110	McC	Pru	.....	76
Master W.	4500	3090	Buda	4¼x5½	28.9	L	C	T	B	Mas	G	Eis	...	D	B-Li	4	U	Spic	W	Timk	8.5:1	34:1	Det	34x4	36x7	Ross	144	McC	Pru	.....	76
Master WL.	4600	3190	Buda	4¼x5½	28.9	L	C	T	B	Mas	G	Eis	...	D	B-Li	4	U	Spic	W	Timk	8.5:1	34:1	Det	34x4	36x7	Ross	170	McC	Pru	.....	80
Menominee D.	....	3245	Cont	4⅛x5¼	27.2	L	C	T	B	Strm	G	Eis	...	F	Full	4	U	Spic	W	Timk	9.25:1	40.08:1	Tut	36x4	36x4†	Ross	160	Mon	Stn	Fir	80
Muskegon 20.	4015	2325	Cont	4⅛x5¼	27.2	L	C	M	B	Stew	V	Eis	...	F	Full	3	U	Hart	I	Torb	9:1	13.5:1	Per	36x4	36x6	Lav	144	Pier	Pru	.....	75
Mutual 2A.	5800	3375	Wis	4x6	25.6	...	..	Cel	F	**Strm**	G	**Bos**	W	**D**	**Selec**	**4**	**A**	**Spic**	**W**	**Shel**	7.75:1	4.8:1	**Math**	**36x4**	**36x8**	**Ross**	**152**	**Dup**	**Smi**	**Fir**	**71**
Nash 3018.	3850	2250	Own	3¾x5¼	22.5	L	C	T	F	Strm	G	Eis	...	D	Selec	4	A	Own	I	Celf	9:1	39.6:1	Math	34x4	34x6	Lav	144	Simp	AuW	.....	73.5
Nash Quad 4017.	6250	3250	Buda	4¼x5½	28.9	L	C	T	F	Strm	G	Eis	...	D	1-Cl	4	A	Spic	F	Own	8.5:1	42.3:1	Math	36x5	36x5	Lav	124	Simp	.....	.....	55
Nelson & LeMoon F2.	4100	2775	Cont	4⅛x5¼	27.2	L	C	T	S	Strm	G	Bos	W	L	B-Li	3	U	Own	W	Timk	7.75:1	2:1	Tut	36x4	36x7	Lav	Q	Pier	Pru	Gdy	80
Netco D.	5900	3000	Cont	4⅛x5¼	27.2	L	C	RT	S	Zen	G	Eis	...	L	B-Li	3	U	Hart	W	Timk	9.25:1	36:1	Per	36x4	36x7	Ross	144	....	Arc	SAE	80
Niles.	5600	2800	Cont	4½x5¼	27.2	L	..	Hen	...	Strm	G	Eis	...	B	Covt	3	A	Bld	...	Timk	9.85:1	.....	S-E'	36x4	36x7	Gem	140	Pier	.....	.....	.....
Noble C40.	4500	....	Buda	4 x5½	25.6	L	C	T	...	Strm	G	Eis	...	F	Full	3	U	M&E	W	Shel	7.75:1	31.1:1	S-El	36x4	36x7	Lav	160	Pier	Bim	Fir	85
Northway B2.	6050	3250	Own	4 x6	25.6	I	C	GO	B	Sheb	V	Bat	W	F	Full	4	U	Spic	W	Shel	7.75:1	37.2:1	Per	36x4	36x4†	Ross	161	Pier	Cla	.....	77
Northwestern WT.	4900	2950	Cont	4⅛x5¼	27.2	L	C	MR	S	Strm	...	Bos	...	H	Selec	3	....	Bld	W	Shel	.....	.....	Shel	34x4	36x7	Ross	164	.....	.....	.....	80
Ogden B1.	4300	2695	Cont	4⅛x5¼	27.2	L	C	T	B	Rayf	G	Bos	...	B	B-Li	4	U	Acme	W	Timk	8.5:1	12.5:1	Tut	36x4	36x7	Gem	160	Pier	Stn	.....	70
Oneida C9.	....	3000	Own	.....	25.6	L	C	..	..	C	..	Mag	...	..	Own	3	A	.....	...	Own	.....	.....	S-El	36x4	36x7	.....	160	Own	.....	.....	82.5
Oshkosh AA4.	4200	3600	H-Sp	3½x5	19.6	L	T	C	B	Zen	V	Bat	N	L	B-Li	4	U	Peters	B	Flot	8.25:1	33:1	Tut	36x6*	36x6*	Ross	165	Dup	Bim	Fir	60
Oshkosh A4.	4200	3500	H-Sp	3½x5	19.6	L	T	C	B	Zen	V	Bat	N	L	B-Li	4	U	Peters	B	Flot	8.25:1	33:1	Tut	36x6*	36x6*	Ross	130	Dup	Bim	Fir	60
Packard 2E.	5100	3600	Own	4 x5½	25.6	L	C	T	F	Own	P	Dix	B	D	Selec	4	A	Spic	W	Flot	7.25:1	33.3:1	.....	34x4	34x4†	Own	144	Own	.....	.....	48.2
Parker F9W.	4500	3500	Wis	4 x6	25.6	L	C	O	F	Strm	G	Bos	W	L	Full	4	A	Arv	W	Own	7.75:1	37.2:1	S-El	34x4	34x6†	Ross	150	Mon	Bim	.....	80
Pierce-Arrow X4.	6150	4300	Own	4 x5½	25.6	T	P	T	F	Own	G	Dix	...	C	Selec	4	A	Own	W	Flot	7:1	37.08:1	S-El	36x4	36x4†	Own	150	Own	Own	Own	70

2 Ton—Continued

Model	Chassis Weight	Chassis Price	Engine—4 Cyl. unless otherwise noted	Bore and Stroke	Horsepower	Valve Arrange't	How Cooled	Radiator Make or Type	Lubrication	Carburetor	Fuel Feed	Ignition System	Engine Starter	Clutch	Transmission	Speeds Forward	Location of Transmission	Universal	Final Drive	Rear Axle	Total Gear Reduction in High	Total Gear Reduction in Low	Springs	Front Tires	Rear Tires	Steering Gear	Wheelbase	Governor	Wheels—Make	Rim Equipment	Pr Cent of Weight on Rear Wheels
Pioneer F	....	2390	Cont	4 1/8x5 1/4	27.3	...	C	.....	...	Strm	...	Eis	...	...	B-Li	4	....	.....	W	Timk	.....	.....	.....	36x4	36x7	.....	164	.....	.....	.....	....
Rainier R8	3600	2400	Cont	3 3/4 x5	22.5	L	T	Har	B	Zen	V	Sim	...	D	B-Li	3	U	Hart	W	Shel	8.66:1	28.83:1	Per	34x4	34x6	Ross	147	Mon	Sch	.....	80
Rowe CDW	4500	3300	Wis	4 x5	32	L	C	Fed	F	Zen	G	Bos	...	L	B-Li	4	U	Spic	W	Shel	7.75:1	11.75:1	Shel	34x4	36x4†	Ross	142	Simp	Hoo	.....	53
Royal	....	3200	Wis	4 x5	25.6	...	C	T	...	Strm	...	Bos	Q	B	Own	..	....	Own	W	Timk	.....	.....	Mer	36x4 1/2	36x6	Ross	...	Mon	.....	.....	....
Sandow I	3800	2375	Cont	3 3/4 x5	22.5	L	P	T	B	Strm	G	Eis	...	D	Full	3	U	Spic	I	Torb	10:1	30:1	GC	36x4	36x6	Ross	150	....	Pru	.....	70
Schacht	5500	3350	Buda	4 1/4 x5 1/4	28.9	L	P	Own	F	Sheb	G	Bos	...	H	Own	3	A	Flex	W	Own	8.66:1	27.06:1	Nat	36x4	36x7	Own	144	Dup	StM	.....	70
Schwartz C	4000	2675	Cont	4 1/8x5 1/4	27.2	L	C	Fed	B	Strm	G	Bos	...	L	B-Li	3	U	Hart	I	Torb	9.1:1	36.49:1	Row	36x4	36x7	Ross	146	Pier	Sch	.....	....
Schwatrz 2C	4000	2675	Cont	4 1/8x5 1/4	27.2	L	P	Fed	B	Strm	...	Bos	...	L	B-Li	3	....	Hart	I	Torb	.....	.....	Row	36x4	36x7	Ross	132	Pier	Sch	.....	....
Selden 2 1/2A	5400	3290	Cont	4 1/8x5 1/4	27.2	L	P	Bus	B	Strm	G	Bos	...	L	B-Li	4	A	Spic	W	Timk	7.75:1	37.5:1	Per	36x4	36x7	Gem	145	Pier	Arc	.....	70
Signal J	5010	3200	Cont	4 1/8x5 1/4	27.2	L	C	McC	B	Strm	G	Eis	...	L	B-Li	4	A	Spic	W	Timk	9.25:1	37:1	Det	34x4	36x8	Ross	150	Pier	Hay	Gdy	80
Sterling 2	**5300**	**3100**	Ster	4 x5 3/4	25.6	L	C	Own	P	Rayf	V	Eis	...	L	B-Li	4	U	Spic	W	Timk	7.7:1	37.26:1	Math	36x4	36x6	Ross	142	Wau	Wan	.....	91
Stewart 7	4460	2695	Cont	4 1/8x5 1/4	27.2	L	P	T	B	Zen	G	Eis	...	F	Full	3	U	Hart	I	Cl	9:1	27:1	Det	34x4	34x7†	Ross	156	Pier	Wan	Fir	72
Stoughton D	....	....	....	4 x5 1/2	25.6	..	P	Own	C	Strm	G	Eis	...	D	B-Li	3	U	.....	W	Shel	7.8:1	.....	S-El	36x4	36x7	.....	140	.....	Own	Gdy	....
Sullivan E	4500	2975	Buda	4 1/8x5 1/2	27.2	L	P	V	F	Strm	V	Bos	...	L	B-Li	3	U	Spic	W	Timk	7.75:1	26:1	Shel	36x4	36x7	Ross	150	.....	Wan	.....	71
Sullivan EL	4500	3050	Buda	4 1/8x5 1/2	27.2	L	P	V	F	Strm	V	Bos	...	L	B-Li	3	U	Spic	W	Timk	7.75:1	26:1	Shel	36x4	36x7	Ross	168	.....	.....	.....	71
Superior E	3600	2450	Cont	4 1/8x5 1/4	27.2	L	P	Idl	G	Strm	V	Eis	...	F	Full	3	U	Arv	I	Torb	8:1	23.2:1	Tut	36x4	36x6	Ross	144	Pier	Sch	Fir	75
Traffic	3175	1395	Cont	3 3/4 x5	22.5	L	T	C	B	Cart	G	Bos	...	C	Covt	3	U	Ther	I	Russ	8.2:1	29.68:1	Det	34x3 1/2	34x5	Own	132	.....	Roy	Fir	85
Transport 50	4285	2585	Cont	4 1/8x5 1/4	27.2	L	P	C	B	Strm	G	Eis	...	F	Full	4	U	Hart	I	Cl	8.15:1	39:1	Det	36x4	36x7	Jac	150	Dup	.....	Fir	70
Triangle C	4200	2485	Wau	3 3/4 x5	22.5	...	C	Per	S	Strm	G	Eis	...	F	Full	3	U	UP	I	Cl	8:1	24:1	Det	36x4	36x6	Gem	146	Wau	Roy	Fir	60
Triumph 2	4900	2950	Buda	4 1/4 x5 1/2	22.5	...	C	H	S	Strm	V	Dix	...	B	Cott	3	U	Hart	I	Russ	.....	8:1	S-El	36x4	36x3 1/2†	Lav	144	Pier	Stn	Stn	70
Vim 2	4700	3150	Her	3 3/4 x5 1/2	22.5	L	C	McC	F	Zen	G	Dix	...	L	B-Li	4	U	Spic	W	Shel	7.75:1	.....	Shel	36x4	36x6	Gem	142	Dup	Smi	.....	....
White 20	4150	3300	Own	3 3/4 x5 1/2	22.5	L	C	C	B	Own	G	Mag	...	D	Selec	4	A	Own	R	Own	.....	.....	.....	36x4	36x7	Own	157	.....	.....	Fir	70
Wichita M	4700	2750	Wau	3 3/4 x5 1/4	22.5	L	P	Per	C	Strm	G	Ber	...	C	Covt	3	A	Own	W	Shel	10.66:1	38.9:1	.....	36x4	36x6	Ross	144	Wau	Bim	Fir	80
Winther 49	5300	3000	Wis	4 x5	25.6	L	P	T	G	Mas	V	Eis	B	B	B-Li	4	A	Bld	I	Cl	9:1	39	Math	34x4	34x4	Ross	150	.....	Own	.....	80
Witt-Will NP	4550	2950	Cont	4 1/8x5 1/4	27.2	O	G	C	B	Zen	G	Eis	...	D	Selec	3	U	Spic	W	Timk	7.8:1	23.4:1	S-El	36x3 1/2	36x7	Ross	144	Pier	Arc	SAE	70

2½ Ton

Model	Chassis Weight	Chassis Price	Engine—4 Cyl. unless otherwise noted	Bore and Stroke	Horsepower	Valve Arrange't	How Cooled	Radiator Make or Type	Lubrication	Carburetor	Fuel Feed	Ignition System	Engine Starter	Clutch	Transmission	Speeds Forward	Location of Transmission	Universal	Final Drive	Rear Axle	Total Gear Reduction in High	Total Gear Reduction in Low	Springs	Front Tires	Rear Tires	Steering Gear	Wheelbase	Governor	Wheels—Make	Rim Equipment	Pr Cent of Weight on Rear Wheels
Acason H	4354	3150	Wau	4 1/4 x5 3/4	28.9	L	P	Can	S	Sheb	V	Eis	...	B	Cott	3	U	Bld	W	Timk	8.5:1	40.37:1	Det	36x4	36x7	Ross	150	Wau	Bim	.....	76
Ace	5630	....	Buda	4 1/4 x5 1/2	28.9	L	C	Spi	F	Sheb	G	AtK	W	L	B-Li	4	A	Spic	W	Timk	7.75:1	31:1	Math	36x6*	40x8*	Ross	156	Pier	Day	Gdy	80
Apex E	4500	2450	Buda	4 1/4 x5 1/2	28.9	L	C	Can	P	Strm	V	Eis	Q	F	Full	3	U	UP	I	Torb	9:1	27:1	Det	36x4	36x6	Lav	150	Dup	.....	Fir	70
Armleder HW	4550	....	Cont	4 1/8x5 1/4	27.2	L	C	T	S	Zen	G	Bos	...	D	B-Li	3	U	Opt	W	Timk	8.5:1	34:1	Math	36x4	36x7	Ross	166	.....	StM	.....	75
Atterbury 7CX-LWB	5325	3275	Cont	4 1/8x5 1/4	27.2	L	C	T	S	Zen	G	Eis	...	L	B-Li	4	U	Spic	W	Timk	9.25:1	37:1	SP	36x4	36x4†	Gem	171	Mon	Arc	Fir	92.5
Atterbury 7CX-STD	5260	3175	Cont	4 1/8x5 1/4	27.2	L	C	T	S	Zen	G	Eis	...	L	B-Li	4	U	Spic	W	Timk	9.25:1	37:1	SP	36x4	36x4†	Gem	153	Mon	Arc	Fir	92.5
Available H2½	4750	3250	Cont	4 1/8x5 1/4	27.2	L	C	T	B	Strm	V	Bos	...	L	B-Li	4	A	Spic	W	Wis	8.66:1	34.66:1	Tut	36x4	36x8	Ross	152	Pier	Sch	.....	90
Bessemer J-2	4500	2785	Cont	4 1/8x5 1/4	27.2	L	C	C	B	Rayf	...	Bos	...	B	B-Li	4	....	Arv	I	Torb	.....	.....	Per	36x4	36x4†	Ross	158	Pier	.....	.....	67
Bethlehem E	3910	2365	Own	4 x4 1/2	25.6	L	C	Fed	B	Sheb	G	Will	G	B	Det	3	U	UP	I	Russ	8.8:1	28.16:1	Shel	34x4	34x6	Lav	144	Mon	Wan	Fir	85
Betz D2	4750	2785	Buda	4 1/4 x5 1/2	28.9	L	C	T	F	Strm	...	Bos	...	L	B-Li	4	....	UM	W	Timk	.....	.....	Tut	36x4	36x7	Ross	150	Pier	.....	.....	75
Brinton F	4500	3000	Cont	4 1/8x5 1/4	27.2	L	C	T	F	Strm	G	Bos	...	D	Selec	3	U	Spic	W	Flot	1:1	3.36:1	S-El	36x4	36x6	Ross	Q	Pier	Sch	.....	....
Brockway K4	4700	3100	Cont	4 1/8x5 1/4	27.2	L	C	Bus	B	Strm	G	Eis	...	L	B-Li	4	A	Spic	W	Timk	8.5:1	34:1	Mer	36x4	36x7	Gem	152	Mon	Hoo	.....	80
Chicago C2½	4500	3100	Her	4 x5 1/2	25.6	L	..	T	S	Strm	G	Bos	...	L	B-Li	4	U	Peters	W	Timk	8.5:1	34:1	Math	36x4	36x7	Gem	156	Simp	Q	Stn	....
Clydesdale 65X	4850	3175	Cont	4 1/8x5 1/4	27.2	L	C	T	S	Zen	G	Bos	...	L	B-Li	4	A	Spic	W	Timk	8.5:1	34:1	Stan	36x4	36x8	Ross	163	Own	Smi	.....	73
Columbia G	4800	2750	Hink	4 x5 1/4	25.6	L	C	T	F	Strm	V	Bos	...	B	Covt	3	A	Spic	I	Russ	9.5:1	.....	Per	36x4	36x7	Own	144	Hink	.....	.....	80
Concord B	4600	3200	Buda	4 3/4 x5 1/2	28.9	L	C	T	S	Zen	G	Eis	...	L	B Li	4	U	Spic	W	Timk	8.5:1	34:1	Per	36x4	36x4†	Ross	150	Mon	Arc	Fir	70
Corbitt B	5000	3500	Cont	4 1/8x5 1/4	27.2	L	C	McC	B	Strm	V	Eis	...	D	B-Li	4	U	Hart	W	Shel	8.75:1	35:1	Shel	36x4	36x7	Ross	148	Simp	Bim	Fir	75
Dart M	4800	3000	Buda	4 3/4 x5 1/2	28.9	L	C	C	F	Zen	G	Eis	...	F	Full	4	U	Spic	W	Own	8.5:1	38:1	Per	36x4	36x7	Ross	150	Pier	Pru	.....	80
Day-Elder C	5300	2850	Buda	4 1/4 x5 1/2	28.9	L	P	Bus	B	Zen	G	Eis	...	D	Covt	3	U	Hart	W	Wis	10.67:1	39.8:1	Shel	36x4	36x7	Ross	150	Mon	Jon	.....	72
DeKalb E2½	4800	2600	Cont	4 1/8x5 1/4	27.2	L	P	T	F	Mas	G	Eis	...	F	Full	3	U	K-B	W	Flot	9.33:1	33:1	Math	36x5	36x6	Ross	144	.....	Hay	.....	79.4
Denby 25	4790	3250	Cont	4 1/8x5 1/4	27.2	L	C	Lng	B	Strm	G	Eis	...	F	Full	4	U	UP	I	Russ	9.45	45.3	Det	36x4	36x7	Ross	150	Mon	Smi	.....	79
Dependable E	**5600**	**2750**	**Buda**	4 1/4 x5 1/2	**28.9**	**L**	**C**	**T**	**F**	**Zen**	**V**	**Dix**	...	**F**	**Full**	**4**	**A**	**Acme**	**W**	**Wis**	**8.66:1**	**13.46:1**	**Per**	**36x4**	**36x7**	**Ross**	**157**	**Pier**	**Bim**	**Fir**	**70**
Doane 1919	5000	3750	Wau	4 1/4 x5 3/4	28.9	...	C	C	S	Mas	...	Bos	...	**D**	Selec	3	U	D	C	Dead	7.72:1	.....	.....	36x5	36x7	Lav	156	Wau	.....	.....	79
Douglas E	4500	2625	Buda	4 1/4 x5 1/2	28.9	L	C	Own	F	Sheb	V	Eis	...	F	Full	4	U	Arv	I	Torb	9:1	43:1	Own	34x4	36x7	Ross	155	Pier	.....	Gdy	65
Douglass F	**4750**	**2775**	**Buda**	4 1/4 x5 1/2	**28.9**	**L**	**C**	**Own**	**F**	**Sheb**	...	**Eis**	...	**F**	**Full**	**4**	....	**Arv**	**W**	**Wis**	.....	.....	**Own**	**34x4**	**36x7**	**Ross**	**155**	**Pier**	.....	.....	**70**
Erie 2½	5400	....	Buda	4 1/4 x5 1/2	28.9	L	C	McC	B	Strm	G	Bos	...	D	Full	4	A	Spic	W	Shel	.....	.....	Per	34x4	36x6	Ross	150	Pier	Hoo	.....	80
Fageol 3400	4600	....	Wau	4 1/4 x5 3/4	28.9	L	C	Spi	S	Zen	G	Dix	...	B	Selec	5	A	Spic	W	Timk	5.6:1	59.5:1	Math	34x4	36x7	Ross	144	Wau	Pru	.....	80
Gary J	4850	2950	Buda	4 1/4 x5 1/2	28.9	L	C	T	F	Mas	G	Eis	...	L	B-Li	4	U	Spic	W	Timk	8.5:1	41:1	S-El	36x4	36x7	Ross	148	McC	Pru	Gdy	....
Gersix K	5200	3150	Buda	4 1/4 x5 1/2	28.9	L	C	Idl	F	Strm	V	Bos	...	B	Cott	3	U	Bld	W	Own	9.66:1	39:1	Tut	36x4	36x7	Ross	150	Mon	Jon	.....	75
Gramm-Bernstein 25	5300	3650	Hink	4 1/4 x5 1/2	28.9	L	C	T	F	Strm	V	Eis	...	D	Own	4	A	Own	W	Stan	7.75:1	36.7:1	.....	36x4	36x4†	Ross	150	..	.....	Fir	....
Hahn EE	4800	....	.....	4 1/2	32.4	L	C	Own	F	Strm	...	Bos	...	D	B-Li	3	....	Spic	W	Timk	.....	.....	.....	36x4	36x8	Ross	145	Pier	.....	.....	....
Harvey WFA	5300	3300	Buda	4 1/4 x5 1/2	28.9	L	P	.....	B	Zen	G	Eis	...	B	B-Li	4	A	Spic	W	Shel	7.75:1	31:1	Shel	36x4	36x7	Ross	150	Mor	Sch	.....	80
Hendrickson I	....	3200	Buda	4 1/4 x5 1/2	28.9	L	P	C	T	F	Strm	G	Dix	...	D	Full	4	A	Ther	W	Timk	7.75:1	37.2:1	S-El	36x4	36x7	Ross	Q	Pier	Smi	.....	80
Hewitt-Ludlow	4800	3300	Buda	4 1/4 x5 1/2	28.9	...	C	T	F	Strm	...	.....	...	B	Cott	4	....	Spic	W	Wis	.....	.....	.....	36x4	36x7	Ross	150	.....	.....	.....	...
Hurlburt 2½	**5600**	**3750**	**Buda**	4 1/4 x5 1/2	**28.9**	**L**	**P**	**Own**	**F**	**Fich**	**G**	**Eis**	...	**M**	**B-Li**	**3**	.....	.....	**W**	**Hind**	.....	.....	**Per**	**36x4**	**36x4**	**Ross**	**170**	**Dup**	**Wau**	.....	**85**
Indepen't H, Youngst'n, O	4600	....	Cont	4 1/8x5 1/4	27.2	L	P	T	C	Sheb	G	Eis	...	F	Full	3	U	Spic	W	Wis	9.66:1	39:1	S-El	36x4	36x8	Ross	148	Pier	.....	.....	85
Indiana 25	5500	3150	Owl	4 1/8x5 1/4	27.2	L	C	T	F	Strm	G	Eis	...	B	Selec	4	A	Acme	W	1/2-Fl	7.75:1	.....	S-El	36x4	36x8	Wohl	156	Pier	Bim	.....	71.5
Jumbo 25	4800	3095	Buda	4 1/4 x5 1/2	28.9	L	P	Own	F	Zen	G	Eis	Q	F	Full	4	U	Arv	I	Cl	9:1	4.84:1	Det	36x4	36x7	Jac	152	Dup	Day	.....	75
Kankakee E	4200	2875	Cont 6	3 1/2 x5 1/4	29.4	L	C	H	F	Zen	V	**Del**	D	D	Warn	3	U	Acme	I	Russ	7.4:1	22.2:1	Tem	34x4	34x6	Ross	170	.....	Bim	Gdy	70
Kelly-Springfield K35	5200	3500	Own	3 3/4 x5 1/4	22.5	L	C	Fed	F	Zen	G	Eis	W	C	Covt	3	A	Own	C	Dead	10.64:1	35.11:1	Per	36x4	36x4†	Gem	144	Pier	StM	.....	89
Kelly-Springfield K36	5540	3500	Own	3 3/4 x5 1/4	22.5	L	C	Fed	F	Zen	G	Eis	W	C	Covt	3	A	Spic	W	1/2-Fl	10.33:1	34.02:1	Per	36x4	36x4†	Gem	144	Pier	StM	.....	89
Kimball C	5100	3975	Wis	4 1/4 x6	28.9	L	C	Flex	B	Zen	V	Eis	...	L	B-Li	4	A	Spic	W	**Shel**	7.75:1	37.31:1	US	36x4	36x7	**Ross**	Q	Dup	**Smi**	.....	80
Kleiber B	....	3800	Cont	4 1/2 x5 1/2	32.4	...	...	.....	...	Strm	G	Bos	...	...	B-Li	..	....	.....	W	.....	39.8:1	31:1	.....	36x4	36x8	Ross	160	....	W&L	.....	....
Koehler M	5050	3165	Her	4 x5 1/4	25.6	L	C	T	P	Zen	G	Eis	...	D	B-Li	4	U	Spic	W	Timk	9.25:1	37:1	Math	36x4	36x7	Lav	162	Simp	Wan	SAE	75

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Model	Chassis Weight	Chassis Price	Engine—4 Cyl. unless otherwise noted	Bore and Stroke	Horsepower	Valve Arrange't	How Cooled	Radiator Make or Type	Lubrication	Carburetor	Fuel Feed	Ignition System	Engine Starter	Clutch	Transmission	Speeds Forward	Location of Transmission	Universal	Final Drive	Rear Axle	Total Gear Reduction in High	Total Gear Reduction in Low	Springs	Front Tires	Rear Tires	Steering Gear	Wheelbase	Governor	Wheels—Make	Rim Equipment	Pr. Cent of Weight on Rear Wheels
3½ Ton—Continued																															
Gramm-Bernstein 35	8640	4450	Hink	4½x5½	32.4	L	C	T	F	Strm	V	Eis	...	D	Own	4	A	Own	W	Stan	8.75:1	50.6:1	.....	36x5	40x5†	Ross	156	.....	.....	Fir	....
Hahn F	6600	....	.....	4½	32.4	L	C	Own	F	Strm	...	Bos	...	D	B-Li	4	....	Spic	W	Timk	.....	.....	.....	36x5	36x5†	Ross	Q	Pier	.....	.....	....
Hall	6100	3750	Cont	4½x5½	32.4	L	P	L	B	Zen	G	Bos	...	L	B-Li	..	A	K-B	W	Timk	10.33:1	.....	Det	36x5	36x5†	Gem	Q	Dup	Smi	.....	....
Harvey WHA	7700	4300	Buda	4½x6	32.4	L	P	T	B	Zen	G	Eis	...	B	B-Li	4	A	Spic	W	Shel	8.75:1	42.35:1	Shel	36x5	36x5†	Ross	160	Mon	Smi	.....	80
Hendrickson J	....	4000	Buda	4¼x5½	28.9	L	C	T	F	Strm	G	Dix	...	D	Full	4	A	Ther	W	Timk	10.33:1	49.6:1	Tut	36x5	36x5†	Ross	Q	Pier	Smi	.....	80
Hewitt-Ludlow	6300	4000	Buda	4½x5½	28.9	..	..	.....	..	Strm	...	Bos	...	B	Cott	4	....	Spic	W	Wis	.....	.....	.....	36x5	36x5†	Ross	156	.....	.....	.....	....
Hurlburt	6400	4400	Buda	4½x6	32.4	L	C	T	B	Flch	G	Eis	...	D	B-Li	4	A	Spic	W	Flot	8.66:1	41.91:1	.....	36x5	36x5	Ross	156	Dup	Wan	.....	....
Indiana 35	7000	3750	Own	4½x5½	30.6	L	C	T	F	Strm	G	Eis	...	D	Selec	4	A	Spic	W	½-Fl	10.25:1	49.6:1	S-El	36x5	36x5†	Wohl	160	Pier	Smi	.....	75
International L	7500	....	Own	4¼x5	28.9	I	T	Own	B	Ens	G	Dix	O	D	Own	4	A	Own	I	Own	11:1	53.25:1	.....	36x5	40x10	Own	160	Own	Own	Fir	50
Jumbo 35	6400	4300	Buda	4½x6	32.4	L	P	Own	F	Zen	G	Eis	Q	L	B-Li	4	U	Spic	I	Cl	9:1	5.35:1	Per	36x5	36x10	Jac	165	Simp	Day	.....	75
Kalamazoo K	7370	3900	Cont 6	3¾x5¼	33.8	L	P	Hvn	B	Strm	V	Bos	D	B	Full	4	A	Acme	W	Shel	10:1	.....	Shel	36x5	36x5†	Ross	160	Pier	Bim	.....	
Kelly-Springfield K40	8285	4400	Own	4½x6½	32.4	T	C	Fed	F	Rayf	G	Eis	W	C	Covt	3	A	Own	C	Dead	10.48:1	31.6:1	Pier	36x5	40x5†	Gem	150	Pier	StM	.....	9
Kissel Heavy Duty	6840	3975	Own	4¼x5½	28.9	L	C	McC	S	Strm	V	Eis	...	W	Warn	4	A	Spic	W	Shel	11.75:1	58.6:1	Shel	36x5	36x5†	Ross	168	Pier	Smi	.....	74
Kleiber C	....	4400	Cont	4½x5½	32.4	..	..	.....	..	Strm	G	Bos	...	..	B-Li	..	A	.....	W	.....	8.75:1	35:1	.....	36x5	36x10	Ross	163	.....	W&L	.....	..
Larrabee-Deyo AB	6850	4000	Cont	4½x5½	32.4	L	C	Bus	S	Strm	G	Bos	...	L	B-Li	4	A	M&E	W	Shel	10.25:1	41:1	Mer	36x5	36x5†	Ross	172	Pier	Hoo	.....	....
Maccar M	6175	4300	Cont	4½x5½	32.4	L	C	Own	B	Strm	G	Bos	...	L	B-Li	3	UJ	Spic	W	Timk	8.75:1	35.09:1	Mer	36x5	36x5†	Ross	174	Pier	Day	Fir	70
Mack AC	8070	4950	Own	5 x6	40	L	C	Own	S	Zen	G	Aer	...	O	Own	3	UJ	Spic	C	Own D	9.05	29.03	Mer	36x5	40x5†	Gem	168	Own	Sch	.....	65
Master A	7000	4150	Buda	4½x6	32.4	L	C	T	B	Mas	G	Eis	...	D	B-Li	4	A	Spic	W	Timk	10.33:1	41.32:1	Det	36x5†	40x5	Ross	158	Pier	Smi	.....	72
Master AL	7200	4290	Buda	4½x6	32.4	L	C	T	B	Mas	G	Eis	...	D	B-Li	4	A	Spic	W	Timk	10.33:1	41.32:1	Det	36x5†	40x5	Ross	194	Pier	Smi	.....	72
Menominee G	....	4270	Cont	4½x5½	32.4	L	C	T	B	Strm	G	Eis	...	F	Full	4	A	Spic	W	Timk	10.33:1	41.32:1	Tut	36x5	36x6†	Ross	160	Pier	Stn	Fir	80
Nelson & LeMoon F3½	6000	7280	Cont	4¼x6½	28.9	T	C	T	S	Strm	G	Bos	...	L	B-Li	4	U	Own	W	Timk	8.75:1	42:1	Tut	36x5	36x5†	Lav	Q	Mon	Pru	Gdy	80
Noble E70	6500	....	Buda	4½x6	32.4	L	C	T	...	Strm	G	Eis	...	F	Full	4	A	.....	W	Shel	8.75:1	.....	S-El	36x5	36x10	Lav	196	Pier	Bim	Fir	85
Northway B3	7260	4250	Own	4 x6	25.6	I	C	GO	F	Sheb	V	Bat	W	F	Full	4	U	Spic	W	Shel	10.25:1	49.2:1	Per	36x5	40x5†	Ross	160	Pier	Cla	.....	72
O.K. 3½ T	....	3850	Buda	4¼x6	32.4	..	P	Owen	B	Zen	V	Eis	...	F	Full	4	U	.....	W	Wis	.....	.....	Tut	36x5	36x10	Ross	164	Pier	.....	.....	....
Old Reliable C	6650	4250	Wis	4¼x6	28.9	L	C	T	B	Strm	V	Bos	...	D	Full	4	A	Spic	W	Shel	8.75:1	42.5:1	Shel	34x5	36x5†	Ross	160	Mon	StM	.....	75
Oneida D9	....	3900	Own	.....	33.5	L	C	.....	..	.....	..	Mag	...	..	.....	4	A	.....	..	Own	.....	.....	S-El	36x5	36x10	.....	170	Own	.....	.....	....
Paige 51-18	7000	3950	Cont	4½x5½	32.4	L	C	T	B	Strm	G	Bos	...	D	Selec	4	A	Spic	W	Timk	10.33:1	49.7:1	Per	36x5	36x5†	Jac	160	Simp	Day	.....	80
Parker J9	6800	4400	Wis	4½x6	32.4	L	C	Own	F	Strm	G	Bos	W	L	Warn	4	A	K-B	W	Own	7.8:1	38.92:1	S-El	38x7*	44x10	Ross	160	Mon	Bim	.....	80
Pioneer A	....	3290	Cont	4½x5½	32.4	..	C	.....	..	Strm	...	Eis	...	..	B-Li	4	....	.....	W	Timk	.....	.....	.....	36x5	36x5†	.....	160	.....	.....	.....	....
Republic 20	6250	3795	Cont	4½x5½	32.4	L	C	T	B	Strm	G	Eis	...	D	Full	4	U	Hart	I	Torb	10:1	48:1	S-El	36x5	36x10	Jac	165	Phar	Smi	Fir	....
Reynolds 3½	....	4450	.....	4½x5½	32.4	I	C	Own	F	Strm	...	Mag	...	..	Own	4	A	.....	W	Own	8.75:1	44.36:1	S-El	36x5	36x5†	Own	173	Hink	Smi	.....	80
Sandow M	6500	3995	Cont	4½x5½	32.4	L	P	T	B	Strm	G	Bos	...	D	B-Li	4	A	Spic	W	Timk	10.33:1	42:1	GC	36x5	36x5†	Ross	175	Mon	Pru	.....	70
Sanford W35	6600	4050	Cont	4½x5½	32.4	L	P	T	F	Strm	G	Bos	...	B	B-Li	4	A	Spic	W	Shel	8.75:1	13.15:1	S-El	36x5	36x5†	Ross	174	Pier	Hoo	Fir	75
Schacht	6500	4150	Buda	4¼x6	28.9	L	P	Own	F	Sheb	G	Bos	...	H	Own	4	A	Flex	W	Own	10.33:1	32.31:1	Nat	36x5	36x5†	Own	168	Dup	StM	.....	70
Schwarts D	7000	4500	Buda	4½x6	32.4	L	P	Fed	B	Strm	...	Bos	...	L	B-Li	4	....	M&E	I	Torb	.....	.....	Row	36x6	36x6†	Ross	170	Dup	Sch	.....	....
Selden 3½A	7100	3990	Cont	4½x5½	32.4	L	P	Bus	B	Strm	G	Eis	...	L	B-Li	4	A	Spic	W	Timk	8.25:1	42:1	Per	36x5	36x10	Gem	162	Pier	Arc	.....	70
Service 71	6930	4085	Buda	4¼x5½	28.9	L	C	T	F	Strm	G	Eis	...	D	Selec	4	A	Spic	W	Timk	8.75:1	42.3:1	.....	36x5	36x5†	Ross	171	Simp	Bim	.....	70
Service 76	7280	4285	Buda	4½x6	32.4	L	C	T	F	Strm	G	Eis	...	D	Selec	4	A	Spic	W	Timk	7.8:1	37.7:1	.....	36x5	36x5†	Ross	171	Simp	Bim	.....	70
Signal M	7070	4200	Cont	4½x5½	32.4	L	C	McC	B	Strm	G	Eis	...	B	B-Li	4	A	Spic	W	Timk	12:1	58:1	Det	36x5	40x5†	Ross	168	Pier	Hay	Gdy	80
Standard 66	6480	4200	Cont	4½x5½	32.4	L	P	Lng	S	Strm	V	Eis	...	D	B-Li	4	A	Spic	W	Timk	10.33:1	.....	S-El	36x5	36x5†	Gem	160	Mon	.....	.....	75
Sterling 3½	8300	4550	Ster	4¼x6¼	32.4	L	C	Own	P	Rayf	V	Eis	...	M	Own	3	A	Spic	W	Timk	8.75:1	39.5:1	Math	36x5	40x5†	Ross	162	Wau	.....	.....	92
Stewart 10	6080	3650	Cont	4½x5½	32.4	L	P	T	B	Zen	G	Eis	...	F	Full	4	U	Hart	I	Cl	10:1	48:1	Det	36x5	36x5†	Ross	165	Pier	Cla	Fir	80
Tiffin PW	6850	4175	Cont	4½x5½	32.4	L	P	T	S	Sheb	G	Bos	...	F	Full	4	A	Acme	W	Shel	8.7:1	41.7:1	Kal	36x5	36x5†	Ross	160	Pier	Smi	Gdy	80
Titan 3½	7300	4300	Buda	4½x6	32.4	L	P	T	F	Strm	G	Eis	...	D	Cott	4	A	UP	I	Cl	9:1	48:1	Math	36x5	40x5†	Lav	162	Simp	Day	.....	70
Tower G3½	6800	4200	Cont	4½x5½	32.4	L	C	T	S	Strm	G	Bos	...	F	Full	4	U	Spic	W	Timk	10.33:1	50:1	Det	36x5	36x5†	Ross	165	Pier	.....	.....	70
Twin City 4 Wheel D-B	7200	4750	Wis	5½x6	42	T	C	H	B	Strm	G	K-W	...	M	Cott	3	A	.....	I	½-Fl	.....	.....	.....	36x6	36x6	Ross	140	Pier	Arc	SAE	60
United C	....	3750	Buda	4½x5½	28.9	L	C	.....	F	Strm	G	Eis	Q	L	B-Li	4	A	Bld	I	Cl	10:1	.....	.....	36x5	36x5†	Ross	160	Simp	Cla	Fir	80
Velie 26B	7400	3900	Cont	4½x5½	32.4	L	C	T	B	Strm	V	Bos	...	L	B-Li	4	A	Spic	W	Timk	10.33:1	49.88:1	Math	36x5	36x5†	Gem	174	Pier	Bim	Gdy	80
Victor M	6600	3800	Cont	4½x5½	32.4	L	C	Own	B	Strm	...	Bos	...	L	B-Li	4	....	Spic	W	Timk	.....	.....	S-El	36x6	36x5†	Gem	176	.....	.....	.....	....
Ward LaFrance 4A	....	4290	.....	4½x6¼	32.4	L	C	T	F	Zen	G	Bos	...	L	B-Li	4	A	Spic	W	Timk	6.28:1	30.38:1	.....	36x5	36x5†	Ross	161	.....	Smi	.....	85
White Hickory M	....	....	Cont	4½x5½	32.4	L	C	T	B	Strm	...	Eis	...	D	Full	4	....	.....	W	Timk	.....	.....	Shel	36x5	36x10	W	156	Simp	.....	.....	....
Wichita O	6500	3750	Beav	4¼x6	28.9	I	P	EM	C	Strm	G	Ber	...	C	B-Li	4	A	Own	W	Shel	11.33:1	47:1	.....	36x5	36x5†	Ross	165	Dup	Smi	.....	80
Wilcox P	6300	....	Own	4¼x5	28.9	L	C	T	S	.....	G	Bos	...	C	Selec	4	A	Own	W	½-Fl	11.75:1	51.7:1	Shel	36x6	35x5†	Own	139	Pier	Smi	.....	....
Wilson G	6800	3950	Cont	4½x5½	32.4	L	P	T	B	Mar	G	Eis	...	B	B-Li	4	A	K-B	W	Timk	8.75:1	42.35:1	Per	36x5	36x5†	Ross	160	Pier	.....	.....	80
Winther 479	7700	4900	Wis	4¼x6	28.9	L	P	T	G	Mas	V	Eis	B	B	Full	4	A	Bld	I	Cl	10:1	48:1	Math	36x5	36x5†	Ross	158	.....	Own	Fir	65
Winther 979	....	4250	Wis	4½x6	32.4	L	P	T	G	Mas	V	Eis	B	B	B-Li	4	A	Bld	I	Cl	7:1	33.88:1	Math	38x7*	42x9*	Ross	168	.....	Cla..	.....	80
4 Ton																															
Bessemer K2	6740	3985	Cont	4½x5½	32.4	L	C	C	B	Rayf	..	Bos	..	B	B-Li	4	....	Spic	I	Torb	.....	.....	Per	36x5	36x10†	Ross	175	Pier	.....	.....	75
Gabriel F	5800	4300	Buda	4½x6	32.4	L	T	T	F	Rayf	G	Bos	L	B	B-Li	4	A	Spic	W	Timk	10.5:1	1:1	Mer	36x5	40x10	Gem	180	Dup	Smi	Fir	65
Highway-Knight	7400	4800	.....	4 x6	25.6	S	T	Own	F	Zen	V	Mag	R	O	Own	4	A	Ther	W	.....	8.75:1	42.35:1	.....	36x5	36x5†	.....	159	.....	Sch	.....	90
Jumbo 40	6800	4875	Buda	4½x6	32.4	L	P	Own	F	Zen	G	Eis	Q	L	B-Li	4	U	Spi	I	Cl	10:1	5.35:1	Per	48x7*	44x10	Jac	165	Simp	Cla	.....	75
Kelly-Springfield K45	8730	4550	Own	4½x6½	32.4	T	C	Fed	F	Rayf	G	Eis	W	C	Covt	3	A	Spic	W	Shel	10.71:1	32.3:1	Per	36x5	40x6†	Gem	150	Pier	StM	.....	93
Kimball E	8100	5000	Wis	5.1x5½	41.9	T	C	Flex	F	Zen	V	Ber	...	L	B-Li	4	A	Spic	W	Shel	8.75:1	42.35:1	US	36x5	40x10	Ross	Q	Dup	Smi	.....	80
King Zeitler	6500	4200	Cont	4½x5½	32.4	L	G	T	B	Strm	...	Bos	...	L	B-Li	4	....	Ther	W	Timk	.....	.....	Mer	36x5	40x5†	Lav	180	Pier	.....	.....	80
Moreland 20G	7810	4875	Cont	4¾x6	36.1	L	C	Own	F	Mill	G	Dix	...	D	Selec	4	A	Ther	W	Timk	7.75:1	37.71:1	US	36x5	40x5†	Ross	168	Pier	Cont	Smi	SAE	..
Noble WW4	7170	3950	Cont	4½x5½	32.4	L	C	T	B	Strm	...	Eis	...	D	Full	4	....	Acme	W	Shel	.....	.....	Kal	36x5	36x5†	Ross	168	Pier	.....	.....	80
Packard 4E	7460	4550	Own	4½x5½	32.4	L	C	T	F	Own	P	Dix	B	D	Selec	4	A	Spic	W	Flot	10:1	46:1	.....	36x5	40x5	Own	156	Own	.....	.....	55
Riker BB	7200	4700	Own	4¼x6	28.9	T	C	T	B	B&B	G	Ber	W	C	Selec	4	A	Own	W	Own	10:1	42.5:1	.....	36x5	36x6†	Ross	150	Own	.....	.....	77
Rowe HW	6520	4350	Wis	4¾x6	28.9	L	C	Fed	F	Zen	G	Bos	...	L	B-L	4	U	Spic	W	Shel	8.75:1	12.75:1	Shel	36x5	36x6†	Ross	156	Simp	Hoo	.....	54

3½ Ton—Continued

4 Ton

Union H.	6600	3500	Wis	4½x6	28.9	L	P	GO	F	Sheb	G	Eis	...	F	Full	4	U	UP	I	Torb	10.25:1	49.2:1	Math	36x6	36x10	Ross	171	Dup	Smi	.....	75
U. S., S.	7000	4450	Cont	4½x5½	32.4	L	C	T	S	Strm	G	Eis	...	O	B-Li	4	A	Q	W	Shel	11.75:1	62.86:1	Shel	36x5	36x5†	Lav	168	Own	Sch	.....	85
Winther 89.	7600	4500	Wis	4¼x6	28.9	L	P	T	G	Mas	V	Eis	B	B	B-Li	4	A	Bld	I	Cl	12.5:1	60.5:1	Math	36x5	40x5†	Ross	156	.....	Cla	.....	80

5 Ton

Acason M.	8350	5150	Wau	4¾x6¾	36.1	L	P	Can	S	Strm	V	Eis	...	B	Cott	3	U	Bld	W	Timk	10.25:1	48.5:1	Det	36x6	40x6†	Ross	187	Wau	Smi	.....	77
Acme E.	8860	4975	Cont	4¾x6	36.1	L	C	GO	F	Rayf	V	Eis	...	B	Cott	4	A	Bld	W	Timk	11.66:1	61:1	Det	36x6	40x6†	Ross	180	Cont	Smi	.....	80
Atterbury 8E.	9635	4975	Cont	4¾x6	36.1	L	C	T	F	Zen	V	Eis	...	L	B-Li	4	A	Spic	W	Timk	11.6:1	56.14:1	SP	36x5	40x6†	Gem	167	Cont	Day	.....	98
Available H5.	9500	5575	Cont	4¾x6	36.1	L	C	T	B	Zen	V	Bos	...	L	B-Li	4	A	Bld	W	Timk	11.66:1	56.4:1	Tut	36x6	40x6†	Ross	190	Cont	Smi	.....	90
Brockway T.	8800	5000	Cont	4¾x6	36.1	L	C	Bus	F	Strm	V	Eis	...	L	B-Li	4	A	Spic	W	Timk	11.66:1	56.43:1	Mer	36x6	40x6†	Gem	174	Dup	Smi	.....	70
Clydesdale 120B.	8500	4975	Cont	4¾x6	36.1	L	C	T	F	Strm	V	Bos	...	L	B-Li	4	A	Spic	W	Timk	11.66:1	56.5:1	Stan	36x6	40x12	Ross	176	Own	Smi	.....	76
Corbitt AA.	8000	5000	Cont	4¾x6	36.1	L	C	McC	F	Strm	V	Eis	...	D	B-Li	4	A	Bld	W	Shel	10.25:1	49.61:1	Shel	36x6	40x6†	Ross	178	Cont	Smi	.....	75
Couple Gear AC.	11000	6700	Wis	5¼x7	44.1	T	G	H	F	Strm	G	Eis	O	...	Own	5	....	Own	B	Own	25.1:1	.....	Tut	36x5†	36x5†	Own	144	.....	Own	Own	60
Day-Elder E.	8350	4500	Buda	4½x6	32.4	L	P	Bus	F	Zen	G	Eis	...	D	B-Li	4	A	Hart	W	Shel	10.25:1	49.6:1	Shel	36x5	40x6†	Ross	170	Mon	Jon	Stn	73
Denby 210.	8590	4900	Cont	4½x5½	32.4	L	C	Lng	B	Strm	G	Eis	...	D	Warn	4	A	Peters	I	Russ	12.13:1	60.5:1	Det	36x6	40x12	Ross	170	Simp	Russ	.....	80
Diamond 210.	7920	5190	.....	4½x5½	32.4	L	C	T	B	Strm	G	Bos	...	...	.....	4	A	Spic	W	.....	13.66:1	66.14:1	Math	36x6	40x6†	.....	170	Pier	.....	.....	....
Diamond T-R.	8790	5660	.....	4¾x6	36.1	L	C	T	B	Strm	G	Bos	...	...	.....	4	A	Spic	W	.....	11.66:1	56.43:1	Math	36x6	40x6†	.....	180	Pier	.....	.....	....
Diamond T-S.	8300	....	Wau	4½x6¼	32.4	L	C	Spi	F	Zen	V	Dix	...	B	Selec	5	A	Spic	W	Timk	8.42:1	89:1	Math	36x6	40x6†	Ross	172	Wau	Pru	.....	80
Fageol 5300.	8100	4550	Cont	4½x5½	32.4	L	C	T	B	Zen	G	Eis	...	B	Own	4	A	Spic	W	Timk	13.66:1	86.16:1	Math	36x6	40x6†	Gem	156	Phar	Smi	Fir	77.5
Federal XC	8870	5000	Wis	4¾x5½	36.1	T	C	T	F	Rayf	G	Eis	...	L	Selec	4	A	Spic	C	Dead	11.4:1	.....	Per	36x6	40x6†	Ross	128	Simp	Smi	.....	....
Garford 68.	8500	5050	Buda	5 x6½	40	L	C	T	F	Mas	G	Eis	...	L	B-Li	4	A	Spic	W	Timk	11.66:1	56.43:1	S-El	36x6	40x6†	Ross	182	McC	Day	.....	....
Gary M.	8485	....	Cont	4½x5½	32.4	L	C	McC	P	Mar	G	Eis	...	D	Selec	4	A	Own	W	Timk	13.6:1	66.7:1	Det	36x6†	40x6†	Jac	163	Mon	Own	SAE	75
G.M.C. 101A.	8655	....	Cont	4½x5½	32.4	L	C	McC	P	Mar	G	Eis	...	D	Selec	4	A	Own	W	Timk	13.6:1	66.7:1	Det	36x6†	40x6†	Jac	187	Mon	Own	SAE	75
G.M.C. 101B.	9860	5500	Cont	4¾x6	36.1	L	C	T	F	Strm	V	Eis	...	C	Own	4	A	Own	W	Stan	9.5:1	55:1	.....	36x6	40x6†	Ross	168	.....	.....	Fir	....
Gramm-Bernstein 50.	8400	....	.....	4¾	....	L	C	Own	F	Strm	...	Bos	...	D	B-Li	4	....	Spic	W	Timk	.....	.....	.....	36x6	40x6†	Ross	Q	.....	.....	.....	....
Hahn FE.	7400	4850	Cont	4½x5½	32.4	L	T	Lng	B	Zen	G	Bos	...	L	B-Li	..	A	K-B	W	Timk	13.66:1	.....	Per	36x4	40x6†	Gem	Q	Dup	Smi	.....	....
Hall.	8900	5000	Buda	4½x6	32.4	L	P	T	B	Zen	G	Eis	...	B	B-Li	4	A	Spic	W	Shel	8.75:1	42.35:1	Shel	36x6	40x6†	Ross	160	Mon	Smi	.....	80
Harvey WKA.	....	5250	.....	5 x6	40	...	C	T	F	Strm	G	.....	...	D	.....	4	.....	Ther	..	Timk	11.66:1	57:1	S-El	36x6	40x6†	Ross	Q	.....	Smi	.....	....
Hendrickson K.	8000	5100	Buda	4½x6	32.4	...	..	.....	..	Strm	..	Bos	...	B	Cott	4	....	Spic	C	.....	.....	.....	.....	36x6	40x6†	Lav	168	.....	.....	.....	....
Hewitt-Ludlow.	....	5600	.....	4 x6	25.6	S	T	Own	F	Zen	V	Mag	R	O	Own	4	A	Ther	W	.....	10.2:1	49.4:1	.....	36x5	40x6†	.....	159	.....	Sch	.....	90
Highway-Knight.	7800	5250	Buda	4½x6	32.4	L	C	T	B	Flch	G	Eis	...	D	B-Li	4	A	Spic	W	Flot	10.66:1	49.99:1	.....	36x5	40x6†	Ross	156	Dup	Wan	.....	....
Hurlburt.	8700	4800	Own	4¾x6¾	36.1	L	C	T	S	Strm	G	Eis	...	B	Selec	4	A	Spic	W	½-Fl	8.75:1	.....	S-El	36x5	40x6	Wohl	170	Wau	Smi	.....	78.5
Indiana 50.	9175	5150	Own	4½x6½	32.4	T	C	Fed	S	Rayf	G	Eis	W	C	Covt	3	A	Own	C	Dead	12.24:1	44.5:1	Per	36x6	40x6†	Gem	150	Pier	StM	.....	93
Kelly-Springfield K50.	8400	5975	Wis	5½x6	42	T	C	Flex	F	Zen	V	Ber	...	L	B-Li	4	A	Spic	W	Shel	8.75:1	42.35:1	US	36x6	40x12	Ross	Q	Dup	Smi	.....	80
Kimball F.	8400	5975	Wis	5½x6	42	T	C	MeC	S	Strm	V	Eis	...	W	Warn	4	A	Spic	W	Shel	13:1	65:1	Shel	36x6	36x6†	Ross	180	Pier	Smi	.....	75
Kissel Goliath.	7200	4785	Own	4¼x5½	28.9	L	C	MeC	S	Strm	V	Eis	...	...	B-Li	4	A	M&E	W	Shel	11.75:1	57:1	Mer	36x6	40x6†	Ross	176	Pier	Hoo	.....	....
Kleiber D.	....	5300	Cont	5¼x5¾	44.1	...	..	.....	..	Strm	G	Bos	...	...	B-Li	..	..	.....	..	.....	.....	.....	.....	36x6	40x6†	Ross	168	Mon	StM	.....	80
Larrabee-Deyo T.	8500	4850	Cont	4½x5½	32.4	L	C	Bus	S	Strm	G	Bos	...	L	B-Li	4	A	M&E	W	Shel	11.75:1	57:1	Mer	36x6	40x6†	Ross	176	Pier	Hoo	.....	....
Mack AC.	8650	5500	Own	5 x6	40	L	C	Own	S	Zen	G	Aer	...	O	Selec	3	UJ	Spic	C	OwnD	10.5	33.7	Mer	36x6	40x6†	Gem	168	Own	Sch	.....	68
Master B.	8000	5290	Buda	4¾x6½	36.1	L	C	T	B	Mas	V	Eis	...	D	B-Li	4	A	Spic	W	Timk	10.25:1	49.61:1	Det	36x6†	40x6†	Ross	170	Pier	Smi	.....	72
Master BL.	8200	5390	Buda	4¾x6½	36.1	L	C	T	B	Mas	V	Eis	...	F	B-Li	4	A	Spic	W	Timk	10.25:1	49.61:1	Det	36x6†	40x6†	Ross	194	Pier	Smi	.....	72
Menominee J.	....	5450	Wis	4¾x5½	36.1	T	C	T	B	Strm	G	Eis	...	F	B-Li	4	A	Spic	W	Timk	13.66:1	.....	Tut	36x6	40x6†	Ross	160	Mon	Stn	Fir	80
Moreland 20J.	9000	....	Cont	4¾x6	36.1	L	C	Own	F	Mill	G	Dix	...	D	Selec	4	A	Ther	W	Timk	10.25:1	49.61:1	US	36x6	40x6†	Ross	192	Cont	Smi	SAE	....
Nelson & LeMoon 15.	8000	4750	Buda	4½x6	32.4	L	C	T	F	Strm	G	Bos	W	L	B-Li	4	A	Own	W	Timk	11.66:1	2:1	Tut	36x6	40x6†	Lav	Q	Pier	Pru	Gdy	80
Old Reliable D.	8400	5250	Wis	5.1x5½	41.9	T	C	T	B	Strm	V	Bos	...	W	D-Sea	4	A	Spic	W	Shel	8.75:1	41.5:1	Shel	36x5	40x6†	Ross	168	Mon	StM	.....	80
Oneida E9.	....	4950	Own	.....	33.5	I	C	.....	..	.....	..	Mag	...	...	Own	4	A	.....	..	Own	.....	.....	S-El	36x6	40x12	.....	180	Own	.....	.....	....
Packard 5-E.	8650	5450	Own	5 x5½	40	L	C	T	F	Own	P	Dix	B	D	Selec	4	A	Spic	W	Flot	10.66:1	49:1	.....	36x6	40x6	Own	156	Own	.....	.....	57.2
Parker M9.	8450	5500	Cont	4¾x6	36.1	L	C	Own	F	Strm	V	Bos	W	L	Warn	4	A	K-B	W	Timk	10.25:1	51.15:1	S-El	36x6	40x6†	Ross	160	Cont	Bim	.....	80
Pierce-Arrow R9.	8200	5500	Own	4 7/8x6	38.1	T	P	T	F	Strm	G	Dix	...	C	Selec	3	A	Own	W	Flot	7.8:1	29.5:1	S-El	36x5	40x6†	Own	168	Own	Own	Own	85
Pioneer J.	....	3990	Cont	4½x5½	32.4	...	C	.....	..	Strm	..	Eis	...	...	B-Li	4	....	.....	W	Timk	.....	.....	.....	36x6	40x6†	.....	170	.....	.....	.....	....
Reynolds 5.	....	5500	.....	4½x5½	32.4	I	C	Own	F	Strm	G	Mag	...	...	Own	4	A	.....	W	Own	10.25:1	51.96:1	S-El	36x6	40x6†	Own	173	Hink	Smi	.....	80
Rowe FW.	8350	5390	Wis	4¾x5½	36.1	T	C	Fed	F	Zen	G	Bos	...	L	B-Li	4	A	Spic	W	Shel	8.75:1	13.59:1	Shel	36x6	40x6†	Ross	171	Simp	Hoo	.....	57
Royal.	....	5000	Wis	4¾x5½	36.1	T	C	T	..	Strm	...	Bos	Q	..	Own	..	....	Own	W	Timk	.....	.....	Mer	36x6	42x6†	Ross	168	Mon	.....	.....	....
Sandow L.	7800	4775	Cont	4½x5½	32.4	L	P	T	B	Strm	...	Bos	...	D	B-Li	4	A	Spic	W	Timk	11.66:1	46.6:1	GC	36x6	40x6†	Ross	175	Mon	Pru	.....	70
Sanford-W50.	7400	4950	Cont	4½x5½	32.4	L	P	T	F	Strm	G	Bos	...	B	B-Li	4	A	Spic	W	Shel	11.7:1	16.69:1	S-El	36x5	40x6†	Ross	174	Pier	Hoo	Fir	75
Schacht.	8000	5150	Buda	4½x6	32.4	L	P	Own	F	Sheb	G	Bos	...	O	Own	8	A	Flex	W	Own	10.33:1	70:1	Nat	36x5	40x6†	Own	168	Dup	StM	.....	70
Selden 5A.	8800	9000	Cont	4¾x6	36.1	L	P	Bus	B	Strm	G	Eis	...	L	B-Li	4	A	Spic	W	Timk	10.25:1	49.6:1	Per	36x6	40x12	Gem	170	Pier	Smi	.....	70
Service 101.	8760	5145	Buda	4½x6	32.4	L	P	T	F	Strm	G	Eis	...	D	Selec	4	A	Spic	W	Timk	10.25:1	49.6:1	.....	36x6	40x6†	Ross	171	Simp	Smi	.....	75
Signal R.	8785	5300	Cont	4¾x6	36.1	L	C	McC	B	Strm	V	Eis	...	B	B Li	4	A	Spic	W	Timk	11.66:1	56:1	Det	36x6	40x6†	Ross	180	Pier	Smi	Gdy	80
Standard 86.	8740	5000	Cont	4¾x5½	32.4	L	P	Lng	S	Strm	V	Eis	...	D	B-Li	4	A	Spic	W	Timk	13.66:1	.....	S-El	36x6	40x6†	Gem	160	Mon	Day	Q	75
Sterling 5-Worm.	9600	5350	Ster	5x6¼	40	L	C	Own	P	Rayf	V	Eis	...	M	Own	3	A	Spic	W	Timk	8.80:1	39.79:1	Math	36x6	40x6†	Ross	168	Wau	Wan	Gdy	92
Sterling 5-Chain.	10000	5600	Ster	5x6¼	40	L	C	Own	P	Rayf	V	Eis	...	M	Own	6	UJ	UM	C	Own	7.04:1	42.5:1	Math	36x6	40x6†	Ross	174	Wau	Smi	.....	91
Tiffin.	8400	5250	Cont	3¾x5¼	33.8	L	C	T	B	Sheb	...	Bos	W	D	Covt	3	....	Acme	W	Shel	8.7:1	.....	Kal	36x6	40x6†	Ross	168	.....	.....	.....	80
Titan 6.	9100	5150	Buda	4½x6	32.4	L	P	T	F	Strm	G	Eis	...	D	Cott	4	A	UP	I	Cl	11:1	59:1	Shel	36x5	40x6†	Lav	156	Simp	Cla	.....	70
Twin City 4-Wheel Drive.	8000	5250	Wis	5½x6	46.2	T	C	H	B	Strm	G	K-W	...	M	Cott	3	A	.....	I	½-Fl	.....	.....	.....	36x7	.....	Ross	140	Pier	SAE	.....	60
United V.	....	4750	Buda	4½x6	32.4	L	C	T	F	Strm	G	Eis	Q	L	B-Li	4	A	Bld	I	Cl	.....	.....	.....	36x5	40x6†	Ross	160	Simp	Cla	Fir	80
U.S.T.	9200	5600	Own	4¾x6½	36.1	L	C	T	F	Strm	G	Eis	...	D	B-Li	4	A	Q	W	Shel	10.25:1	54.84:1	Shel	36x6	40x6†	Lav	170	Wau	Smi	.....	90
Walter S.	8000	5500	Wau	4½x6¼	32.4	L	C	T	F	Strm	G	Bos	W	D	Warn	4	....	M	I	Own	9:1	45:1	S-El	36x6	40x6†	Ross	168	Own	Day	.....	80
Ward LaFrance 5A.	9300	5290	.....	5x6¼	40	L	C	T	S	.....	...	.....	...	L	B-Li	4	A	Spic	W	Timk	8.8:1	30.37:1	.....	36x6	40x6†	Ross	163	.....	Smi	.....	85
White 45.	7925	5000	Own	4¼x5¾	28.9	L	C	T	F	Own	V	Mag	...	D	Selec	4	U	Own	R	Own	.....	.....	.....	36x6	40x6	Own	174	Own	.....	.....	70
Wilcox W.	9000	....	Wau	4¾x6¾	36.1	L	C	T	S	.....	...	.....	...	C	Selec	4	A	Spic	W	½-Fl	42.1:1	8.7:1	Shel	36x5	40x12	Gem	162	.....	Smi	.....	....
Wilson H.	7500	4800	Cont	4½x5½	32.4	L	C	T	B	Mar	G	Eis	...	B	B-Li	4	A	K-B	W	Timk	10.25:1	49.61:1	Per	36x6	40x6†	Ross	160	Pier	.....	.....	80
Winther 109.	8300	5000	Wis	4¾x5½	36.1	T	C	T	G	Mas	V	Eis	B	B	B-Li	4	A	Bld	I	Cl	12.5:1	60.5:1	Math	36x5	40x6†	Ross	162	Dup	Cla	.....	80

5½, 6 and 7 Ton

Doane 1919.	8500	5825	Wau	4¾x6¾	36.1	L	C	C	S	Mas	G	Bos	...	D	Selec	3	U	D	C	Dead	10.6:1	.....	.....	36x6	40x6†	Lav	178	Wau	West	.....	79
Hall.	8006	4850	Cont	4½x5½	32.4	L	P	T	B	Zen	G	Bos	...	...	B-Li	..	U	K-B	W	Timk	12:1	.....	Det	36x5	40x6†	Gem	Q	Dup	Smi	.....	....
Garford 69.	9350	5300	Wis	5.1x5½	41.6	T	C	T	F	Rayf	...	Eis	...	L	Selec	4	...	Spic	C	Dead	11.4:1	.....	Per	36x6	40x7†	Ross	128	Simp	Smi	.....	....
Kelly-Springfield K60.	9500	5500	Own	4½x6½	32.4	T	C	Fed	F	Rayf	G	Eis	W	C	Covt	3	A	Own	C	Dead	12.39:1	45.2:1	Per	36x6	40x7†	Gem	150	Own	StM	.....	93
Maccar G.	8750	5250	Cont	4¾x6	36.1	L	C	C	B	Zen	G	Bos	...	L	B-Li	4	A	Spic	W	Timk	10.25:1	49.61:1	Mer	36x5	40x6†	Ross	186	Cont	Day	Fir	70
Packard 6E.	8925	5700	Own	5 x5½	40	L	C	T	F	Own	P	Dix	B	D	Selec	4	A	Spic	W	Flot	10.66:1	49:1	.....	36x6	40x7	Own	156	Own	.....	.....	58.5
Royal 6.	....	5400	Wis	5½x6	42	...	C	T	..	Strm	...	Bos	Q	..	Own	..	....	Own	W	Timk	.....	.....	Mer	36x6	40x6†	Ross	168	Mon	.....	.....	....
Tiffin 4.	9000	5450	Cont	3¾x5¼	33.8	L	C	T	B	Sheb	G	Bos	W	D	Covt	3	A	Acme	W	Shel	10.25:1	60.7:1	Kal	36x6	40x12	Ross	168	.....	Smi	Gdy	80
Winther 129.	9000	5250	Wis	5½x6	42	T	C	T	G	Mas	V	Eis	B	B	B-Li	4	A	Bld	I	Cl	12.5:1	60.5:1	Math	36x6	40x6	Ross	162	Dup	Cla	.....	80
Mack AC.	8672	5750	Own	5 x6	40	L	C	Own	S	Zen	G	Aer	...	O	Own	3	UJ	Spic	C	OwnD	10.5	33.7	Mer	36x6	40x12	Gem	168	Own	Sch	.....	73

Model	Chassis Weight	Chassis Price	Engine—4 Cyl. unless otherwise noted	Bore and Stroke	Horsepower	Valve Arrange't	How Cooled	Radiator Make or Type	Lubrication	Carburetor	Fuel Feed	Ignition System	Engine Starter	Clutch	Transmission	Speeds Forward	Location of Transmission	Universal	Final Drive	Rear Axle	Total Gear Reduction in High	Total Gear Reduction in Low	Springs	Front Tires	Rear Tires	Steering Gear	Wheelbase	Governor	Wheels—Make	Rim Equipment	Pr. Cent of Weight on Rear Wheels
5½, 6 and 7 Ton—Continued																															
Winther 149	9600	5500	Wis	5 1/16x6	42	T	C	T	G	Mas	V	Eis	B	B	B-Li	4	A	Bld	I	Cl	12.5:1	60.5:1	Math	36x6	40x7	Ross	162	Dup	Cla	.....	80
Couple Gear LD-6	12000	7350	Wis	5¼ x7	44.1	T	G	H	F	Strm	G	Eis	O	...	Own	5	....	Own	B	Own	12:1	.....	Tut	36x5†	36x6	Own	144	.....	Own	Own	65
Mack AC	9050	6000	Own	5 x6	40	L	C	Own	S	Zen	G	Aer	...	O	Own	3	UJ	Spic	C	Own D	11.58	37.16	Mer	36x7	40x7†	Gem	168	Own	Sch	.....	73
Old Reliable K,L,M	10240	6250	Wau	4¾ x6¾	36.1	L	C	T	B	Strm	G	Bos	...	W	D-Sea	4	A	Spic	C	Shel	10.86:1	50.9:1	Shel	36x6	40x7†	Ross	136	Wau	Smi	.....	78
Royal 7	.....	....	Wis	5¼ x7	44.1	...	C	T	...	Strm	...	Bos	Q	...	Own	...	A	.....	W	Timk	.....	.....	Mer	36x7	40x7†	Ross	168	Mon	.....	.....	....
Sterling 7½-Chain	11000	6000	Ster	5x6¼	40	L	C	Own	P	Rayf	V	Eis	...	M	Own	6	UJ	UM	C	Own	7.26:1	43.6:1	Math	36x6	40x7†	Ross	174	Wau	Smi	.....	91
Wichita S	9200	5400	Beav	4 1/16x6	32.4	I	P	EM	C	Strm	G	Ber	...	C	Own	4	A	Own	...	Own	13:1	66.2:1	.....	36x6	40x6†	Ross	165	Dup	Smi	.....	90
Gasoline Tractor-Trucks																															
Columbia T	4000	2750	Hink	4 x5¼	25.6	L	C	T	B	Shk	...	Dix	...	C	Covt	3	....	Spic	I	Russ	.....	.....	Per	36x4	36x7	Own	112	Pier	.....	.....	....
Federal Light Duty	4700	3050	Cont	4 1/16x5¼	27.2	L	C	T	B	Zen	G	Eis	...	B	Own	4	A	Spic	W	Timk	9.25:1	40.7:1	Math	36x4	36x7	Gem	110	Phar	.....	Fir	....
Federal Heavy Duty	6800	4025	Cont	4½x5½	32.4	L	C	T	B	Zen	G	Eis	...	B	Own	4	A	Spic	W	Timk	12:1	59.88:1	Math	36x5	36x5†	Gem	114	Phar	.....	Fir	....
Garford 70HT	4750	3290	Buda	4¼ x5½	28.9	L	C	T	F	Strm	G	Spl	...	L	Selec	4	....	Spic	W	Timk	.....	.....	Per	36x4	36x7	Ross	119	Simp	.....	.....	....
Garford 77CT	7200	4400	Wis	4¾ x5½	36.1	T	C	T	F	Rayf	G	Eis	...	L	Selec	4	....	Spic	W	Timk	.....	.....	Per	36x5	40x5†	Ross	105	Simp	Smi	.....	....
Garford 68T	8450	5100	Wis	5.1x5½	41.6	T	C	T	F	Rayf	G	Eis	...	L	Selec	4	....	Spic	C	Dead	.....	.....	Per	36x6	40x6†	Ross	102	Simp	Smi	.....	....
Hewitt-Ludlow 6-Ton	4000	3300	Buda	4¼ x5½	28.9	...	..	T	F	Strm	...	Bos	...	B	.....	...	...	Spic	C	.....	.....	.....	.....	36x5	36x4†	Lav	...	.....	.....	.....	....
Hood	2900	1425	Own	3¾ x3¾	22.5	T	C	Idl	S	Holl	G	Mag	...	D	Plan	2	U	Own	C	Own	8:1	24:1	Lah	20x3½	20x5	Own	60	.....	Own	.....	65
Jumbo D	4450	2700	Buda	4¼ x5½	28.9	L	C	GO	F	Zen	G	Eis	Q	F	Full	3	U	Arv	I	Cl	9:1	4.84:1	Det	36x4	36x7	Jac	152	Dup	Day	.....	60
Knox 35	8500	6000	Own	5 x5½	40	I	C	Fed	F	Zen	V	Mag	G	D	Selec	3	A	.....	W	Timk	1:.08	1:.0145	.....	36x4	38x6†	Ross	108	.....	Wan	.....	60
Knox 36 3-Ton	10000	6500	Own	5 x5½	40	I	C	Fed	F	Zen	V	Mag	G	D	Selec	3	A	.....	W	Timk	1:.08	1:.0145	.....	36x4	38x6†	Ross	108	.....	Wan	.....	....
Koehler MT	4750	3250	Her	4 x5 1/8	25.6	L	C	T	P	Zen	...	Eis	...	D	B-Li	4	A	Spic	W	Timk	9.25:1	37:1	Math	36x4	36x7	Lav	142	Simp	Wan	SAE	....
Kuhn	9000	5000	Wis	4¼ x5½	28.9	T	C	H	S	Rayf	...	Bos	...	C	Selec	4	....	.....	B	Own	.....	.....	.....	36x7	36x7	.....	138	.....	.....	.....	....
Lombard	8000	....	Spec 6	5½x6¾	72.7	...	C	Spec	F	Sheb	P	.....	...	D	Spec	..	A	.....	..	W	.....	.....	.....	.....	.....	Spec	...	.....	.....	.....	90
Mack AB 5-Ton	4940	3400	Own	4 x5	25.6	L	C	Own	S	Zen	G	Aer	...	L	B-Li	4	U	Bld	C	Own	10.53	42.27	Mer	36x4	36x4†	Gem	120	Own	Sch	.....	....
Mack AC 7-Ton	7670	4950	Own	5 x6	40	L	C	Own	S	Zen	G	Aer	...	O	Own	3	UJ	Spic	C	Own D	10.76	34.60	Mer	36x5	40x5†	Gem	119	Own	Sch	.....	....
Mack AC 10-Ton	8250	5500	Own	5 x6	40	L	C	Own	S	Zen	G	Aer	...	O	Own	3	UJ	Spic	C	Own D	11.58	37.16	Mer	36x6	40x6†	Gem	119	Own	Sch	.....	....
Mack AC 13-Ton	8272	5750	**Own**	**5 x6**	**40**	**L**	**C**	**Own**	**S**	.....	**G**	**Aer**	...	**O**	**Own**	**3**	**UJ**	**Spic**	**C**	**Own D**	**12.92**	**41.5**	**Mer**	**36x6**	**40x12**	**Gem**	**119**	**Own**	**Sch**	.....	....
Mack AC 15-Ton	8650	6000	Own	5 x6	40	L	C	Own	S	Zen	G	Aer	...	O	Own	3	UJ	Spic	C	Own D	14.10	45.26	Mer	36x7	40x7†	Gem	119	Own	Sch	.....	....
Rennoc 8-Ton	5050	2850	Buda	4 1/16x5½	27.2	L	C	T	F	Strm	...	Spl	...	D	Warn	4	....	Hart	W	Wis	.....	.....	Row	36x5	36x7	Lav	116	Pier	.....	.....	60
Watson	6500	4050	Cont	4½x5½	32.4	L	C	Jam	B	Strm	...	Bos	...	L	B-Li	4	....	Spic	W	Timk	.....	.....	Shel	34x4	36x5	Gem	80	Pier	.....	.....	37

Electric Commercial Cars

E. C. M. Name and Model Number	Carrying Capacity	Chassis Weight	Chassis Price	Maximum Speed	Battery	Mileage Per Charge	Motor	Controller	Speeds Forward	Drive	Rear Axle	Springs	Front Tires	Rear Tires	Steering Gear	Wheelbase	Pr. Cent of Weight on Rear Wheels
Ward WS	750	1400	.....	12	Edis	45	G-E	Own	4	W	Shel	Shel	32x2½	32x3	Own	88	60
C-T ½	1000	1800	1900	14	Opt	60	G-E	Own	4	C-T	Flot	Shel	36x3	36x3	W	89¼	60
Walker M	1000	2300	.....	15	Opt	60	West	West	5	O	Own	Math	34x3	36x3½	Ross	93	66
Atlantic 1C	2000	2770	.....	12	Opt	.....	G-E	G-E	4	C	Timk	S-El	34x4	36x4	Ross	103	65
Ward WA	1250	2730	.....	12	Edis	47	G-E	G-E	4	W	Shel	Shel	32x3	34x3½	Own	90	60
C-T 1	2000	2500	2300	14	Opt	60	G-E	Own	4	C-T	Flot	Shel	36x3½	36x4	W	101	60
Walker K	2000	2700	.....	14	Opt	60	West	West	5	O	Own	Math	34x3½	36x4	Ross	96	66
Ward WB	2000	3430	.....	10	Edis	43	G-E	G-E	4	W	Shel	Shel	34x3½	36x4	Own	102	60
Atlantic 2C	4000	3590	.....	11	Opt	.....	G-E	G-E	4	C	Timk	S-El	34x4	36x3†	Ross	115	65
C-T 2	4000	3500	2700	12	Opt	60	G-E	Own	4	C-T	Flot	Shel	36x4	36x4†	W	116	60
Walker L	4000	3800	.....	13	Opt	60	West	West	5	O	Own	Math	38x4	38x6	Ross	112	66
Ward WD	4000	4500	.....	8.5	Edis	35	G-E	G-E	4	W	Shel	Shel	36x4	36x7	Own	114	60
Atlantic 3C	7000	5220	.....	10	Opt	.....	G-E	G-E	5	C	Timk	.....	36x5	40x5†	Ross	135	65
C-T 3½	7000	5000	3900	11	Opt	50	G-E	Own	4	I	Dead	Shel	36x6†	36x4†	W	122	55
Ward WF	7000	6600	.....	7	Edis	30	G-E	G-E	4	W	Shel	Shel	36x5	36x8	Own	132	60
Atlantic 5C	10000	6230	.....	9	Opt	.....	G-E	G-E	5	C	Timk	S-El	36x6	40x5†	Ross	144	65
Couple Gear H	7000	9000	4800	10	Phil	30	Own	Own	5	B	Own	Tut	36x5†	36x5†	Own	96	55
Couple Gear	10000	10000	5250	7	Phil	30	Own	Own	5	B	Own	Tut	36x5†	36x5†	Own	96	75
C-T 5	10000	6000	4400	9	Opt	50	G-E	Own	4	I	Dead	Shel	36x7	36x5†	W	132	55
Walker P	7000	5600	.....	11	Opt	50	West	West	5	O	Own	Math	36x5	38x5†	Ross	131	66
Walker N	10000	6400	.....	10	Opt	50	West	West	5	O	Own	Math	36x6	38x6†	Ross	141	66
Ward WH	10000	8375	.....	6	Edis	26	G-E	G-E	4	W	Shel	Shel	36x7	40x10	Own	144	60
Atlantic 6C	13000	6940	.....	8	Opt	.....	G-E	G-E	5	C	Timk	S-El	36x6	40x6	Ross	156	55
Couple Gear	14000	11000	5900	10	Phil	30	Own	Own	5	B	Own	Tut	36x5†	36x5	Own	96	55

Manufacturers Whose Models Are Included in Specifications on Preceding Pages

Acason—Acason Motor Truck Co., Detroit, Mich.
Ace—American Motor Truck Co., Newark, Ohio.
Acme—Acme Motor Truck Co., Cadillac, Mich.
All-American—All-American Truck Co., Chicago, Ill.
Apex—Hamilton Motor Co., Grand Haven, Mich.
Armleder—O. Armleder Co., Cincinnati, Ohio.
Atlantic—Atlantic Electric Vehicle Co., Newark, N. J.
Atlas—Martin Truck & Body Corp., York, Pa.
Atterbury—Atterbury Motor Car Co., Buffalo, N. Y.
Autocar—Autocar Co., Ardmore, Pa.
Available—Available Truck Co., Chicago, Ill.

Beck-Hawkeye—Beck-Hawkeye Motor Truck Works, Cedar Rapids, Iowa.
Belmont—Belmont Motors Corp., Lewistown, Pa.
Bessemer—Bessemer Motor Truck Co., Grove City, Pa.
Bethlehem—Bethlehem Motor Truck Corp., Allentown, Pa.
Betz—Betz Motor Truck Co., Hammond, Ind.
Brinton—Brinton Motor Truck Co., Philadelphia, Pa.
Briscoe—Briscoe Motor Corp., Jackson, Mich.
Brockway—Brockway Motor Truck Co., Cortland, N. Y.

C. T.—Commercial Truck Co. of America, Philadelphia, Pa.
Cameron—Cameron Motors Corp., New York, N. Y.
Chevrolet—Chevrolet Motor Co. of Mich., Flint, Mich.
Chicago—Chicago Motor Truck, Inc., Chicago, Ill.
Clydesdale—Clyde Cars Co., Clyde, Ohio.
Collier—Collier Motor Truck Co., Bellevue, Ohio.
Columbia—Columbia Motor Truck & Trailer Co., Pontiac, Mich.
Comet—Comet Automobile Co., 156 S. Water St., Decatur, Ill.
Commerce—Commerce Motor Car Co., Detroit, Mich.
Concord—Abbot-Downing Truck & Body Co., Concord, N. H.
Conestoga—Conestoga Motor Truck Co., Lancaster, Pa.
Corbitt—Corbitt Motor Truck Co., Henderson, N. C.
Couple Gear—Couple Gear Freight Wheel Co., Grand Rapids, Mich.

Dart—Dart Truck & Tractor Corp., Waterloo, Ia.
Day-Elder—Day-Elder Motors Corp., Newark, N. J.
Dearborn—Dearborn Truck Co., Chicago, Ill.
Defiance—Turnbull Motor Truck & Wagon Co., Defiance, Ohio.
DeKalb—DeKalb Wagon Co., DeKalb, Ill.
Denby—Denby Motor Truck Co., Detroit, Mich.
Dependable—Dependable Truck & Tractor Co., Galesburg, Ill.
Diamond T—Diamond T Motor Car Co., Chicago, Ill.
Diehl—Diehl Motor Truck Works, Philadelphia, Pa.
Dispatch—Dispatch Motor Car Co., Minneapolis, Minn.
Doane—Doane Motor Truck Co., San Francisco, Cal.
Dodge—Dodge Bros., Detroit, Mich.
Dorris—Dorris Motor Car Co., St. Louis, Mo.
Douglas—Douglas Motors Corp., Omaha, Nebr.
Duplex—Duplex Truck Co., Lansing, Mich.

Ellsworth—Mills-Ellsworth Co., Keokuk, Ia.
Erie—Erie Motor Truck Mfg. Co., Erie, Pa.
Evans—Evans Truck & Axle Co., Auburn, Ind.

F. W. D.—Four Wheel Drive Auto Co., Clintonville, Wis.
Fageol—Fageol Motors Co., Oakland, Cal.
Famous—Famous Trucks, Inc., St. Joseph, Mich.
Fargo—Fargo Motor Truck Co., Chicago, Ill.
Federal—Federal Motor Truck Co., Detroit, Mich.
Ford—Ford Motor Co., Highland Park, Mich.
Forschler—Forschler Motor Truck Mfg. Co., New Orleans, La.
Fulton—Fulton Motor Truck Co., New York, N. Y.

G. M. C.—General Motors Truck Co., Pontiac, Mich.
Gabriel—Gabriel Motor Truck Co., Cleveland, Ohio.
Garford—Garford Motor Truck Co., Lima, Ohio.
Gary—Gary Motor Truck Co., Gary, Ind.
Gersix—Gersix Mfg. Co., Seattle, Wash.
Giant—Giant Truck Corp., Chicago Heights, Ill.
Gramm-Bernstein—Gramm-Bernstein Motor Truck Co., Lima, Ohio.
Grant—Grant Motor Car Corp., Truck Division, Cleveland, Ohio.

Hahn—Hahn Motor Truck & Wagon Co., Hamburg, Pa.
Hall—Lewis-Hall Iron Works, Detroit, Mich.
Harvey—Harvey Motor Works, Detroit, Mich.
Hawkeye—Hawkeye Truck Co., Sioux City, Ia.
Hendrickson—Hendrickson Motor Truck Co., Chicago, Ill.
Hewitt-Ludlow—Ralston Iron Works, San Francisco, Cal.
Highway-Knight—Highway Motors Co., Chicago, Ill.
Higrade—Higrade Motors Co., Harbor Springs, Mich.
H & M—H & M Motor Truck Co., Inc., Baltimore, Md.
Hood—Hood Mfg. Co., Seattle, Wash.
Hoover—Hoover Wagon Co., York, Pa.
Huffman—Huffman Bros. Co., Elkhart, Ind.
Hurlburt—Hurlburt Motors, Inc., New York, N. Y.

Independent—Independent Motor Co., Youngstown, O.
Independent—Independent Motor Truck Co., Inc., Davenport, Ia.
Indiana—Indiana Truck Corp., Marion, Ind.
International—International Harvester Co., Chicago, Ill.

Jones—Jones Motor Car Co., Wichita, Kans.
Jumbo—Nelson Motor Truck Co., Saginaw, Mich.

Kalamazoo—Kalamazoo Motor Corp., Kalamazoo, Mich.
Kankakee—Kankakee Automobile Co., Kankakee, Ill.
Keldon—House Cold Tire Setter Co., St. Louis, Mo.
Kelly-Springfield—Kelly-Springfield Motor Truck Co., Springfield, Ohio.
Keystone—Commercial Car Unit Co., Philadelphia, Pa.
Kimball—Kimball Motor Truck Co., Los Angeles, Cal.
King Zeitler—King Zeitler Co., Chicago, Ill.
Kissel—Kissel Motor Car Co., Hartford, Wis.
Kleiber—Kleiber & Co., Inc., San Francisco, Cal.
Knox—Knox Motors Co., Springfield, Mass.
Koehler—H. J. Koehler Motors Corp., Newark, N. J.
Kuhn—Kuhn Tractor Truck Co., Seattle, Wash.

Lange—Lange Motor Truck Co., Pittsburgh, Pa.
Larrabee-Deyo—Larrabee-Deyo Motor Truck Co., Inc., Binghamton, N. Y.
L. M. C.—Louisiana Motor Car Co., Shreveport, La.
Lombard—Lombard Auto Tractor Truck Corp., New York, N. Y.
Luedinghaus—Luedinghaus-Espenschied Wagon Co., St. Louis, Mo.
Luverne—Luverne Automobile Co., Luverne, Minn.

Maccar—Maccar Truck Co., Scranton, Pa.
Mack—International Motor Co., New York, N. Y.
Manly—Manly Motors Co., Waukegan, Ill.
Marshall—Marshall Mfg. Co., Chicago, Ill.
Master—Master Trucks, Inc., Chicago, Ill.
Maxwell—Maxwell Motor Co., Inc., Detroit, Mich.
Menominee—Menominee Motor Truck Co., Menominee, Mich.
Moore—Moore Motor Vehicle Co., Danville, Ill.
Moreland—Moreland Motor Truck Co., Los Angeles, Cal.
Muskegon—Muskegon Engine Co., Muskegon, Mich.
Mutual—Mutual Truck Co., Sullivan, Ind.
Myers—E. A. Myers Co., Pittsburgh, Pa.

Napoleon—Napoleon Motors Co., Traverse City, Mich.
Nash—Nash Motors Co., Kenosha, Wis.
Nelson-LeMoon—Nelson & Le Moon, Chicago, Ill.
Netco—New England Truck Co., Fitchburg, Mass.
Niles—Niles Motor Truck Co., Pittsburgh, Pa.
Noble—Noble Motor Truck Co., Kendallville, Ind.
Northway—Northway Motors Co., Natick, Mass.
Northwestern—Starr Carriage Co., Seattle, Wash.
Norwalk—Norwalk Motor Car Co., Martinsburg, W. Va.

O. K.—Oklahoma Auto Mfg. Co., North Muskogee, Okla.
Ogden—Ogden Motor & Supply Co., Chicago, Ill.
Old Hickory—Kentucky Wagon Mfg. Co., Louisville, Ky.
Old Reliable—Old Reliable Motor Truck Co., Chicago, Ill.
Oldsmobile—Olds Motor Works, Lansing, Mich.
Oneida—Oneida Motor Truck Co., Green Bay, Wis.
Oshkosh—Oshkosh Motor Truck Mfg. Co., Oshkosh, Wis.
Overland—Willys-Overland Co., Inc., Toledo, Ohio.

Packard—Packard Motor Car Co., Detroit, Mich.
Paige—Paige-Detroit Motor Car Co., Detroit, Mich.
Parker—Parker Motor Truck Co., Milwaukee, Wis.
Patriot—Hebb Motors Co., Lincoln, Nebr.
Piedmont—Piedmont Motor Car Co., Inc., Lynchburg, Va.
Pierce-Arrow—Pierce-Arrow Motor Car Co., Buffalo, N. Y.
Pioneer—Pioneer Motor Truck Co., Detroit, Mich.
Pittsburgher—Pittsburgh Truck Mfg. Co., Pittsburgh, Pa.
Pony—Minnesota Machinery & Foundry Co., Minneapolis, Minn.

Rainier—Rainier Motor Corp., Flushing, L. I., N. Y.
Reliance—Reliance Motor Truck Co., Appleton, Wis.
Rennoc—Rennoc-Leslie Motor Co., Philadelphia, Pa.
Reo—Reo Motor Car Co., Lansing, Mich.
Republic—Republic Motor Truck Co., Inc., Alma, Mich.
Reynolds—Reynolds Motor Truck Co., Mt. Clemens, Mich.
Riker—Locomobile Co. of America, Bridgeport, Conn.
Rock Falls—Rock Falls Mfg. Co., Sterling, Ill.
Rowe—Rowe Motor Mfg. Co., Lancaster, Pa.
Royal—Royal Motor Truck of N. Y., New York, N. Y.

Sandow—Sandow Motor Truck Co., Chicago, Ill.
Sanford—Sanford Motor Truck Co., Syracuse, N. Y.
Schacht—G. A. Schacht Motor Truck Co., Reading, Pa.
Schwartz—Schwartz Motor Truck Co., Reading, Pa.
Selden—Selden Truck Corp., Rochester, N. Y.
Service—Service Motor Truck Co., Wabash, Ind.
Shaw—Walden W. Shaw Livery Co., Chicago, Ill.
Signal—Signal Motor Truck Co., Detroit, Mich.
Standard—Standard Motor Truck Co., Detroit, Mich.
Sterling—Sterling Motor Truck Co., Milwaukee, Wis.
Stewart—Stewart Motor Corp., Buffalo, N. Y.
Stoughton—Stoughton Wagon Co., Stoughton, Wis.
Sullivan—Sullivan Motor Truck Co., Atlanta, Ga.
Superior—Superior Motor Truck Co., Atlanta, Ga.

Texan—Texas Motor Car Asso., Fort Worth, Texas.
Tiffin—Tiffin Wagon Co., Tiffin, Ohio.
Titan—Titan Truck Co., Milwaukee, Wis.
Tower—Tower Motor Truck Co., Greenville, Mich.
Traffic—Traffic Motor Truck Corp., St. Louis, Mo.
Transport—Transport Truck Co., Mt. Pleasant, Mich.
Triangle—Triangle Motor Truck Co., St. Johns, Mich.
Triumph—Triumph Truck & Tractor Co., Kansas City, Mo.
Twin City—Twin City Four Wheel Drive Co., Inc., St. Paul, Minn.

Union—Union Motor Truck Co., Bay City, Mich.
United—United Motors Co., Grand Rapids, Mich.
U. S.—United States Motor Truck Co., Cincinnati, Ohio.

Velie—Velie Motors Corp., Moline, Ill.
Victor—Victor Motor Truck & Trailer Co., Chicago, Ill.
Vim—Vim Motor Truck Co., Philadelphia, Pa.

Walker—Walker Vehicle Co., Chicago, Ill.
Walter—Walter Motor Truck Co., New York, N. Y.
Ward—Ward Motor Vehicle Co., Mt. Vernon, N. Y.
Ward La France—Ward La France Truck Co., Inc., Elmira, N. Y.
Watson—Watson Wagon Co., Canastota, N. Y.
White—White Co., Cleveland, Ohio.
White Hickory—White Hickory Wagon Mfg. Co., Atlanta, Ga.
Wichita—Wichita Falls Motor Co., Wichita Falls, Tex.
Wilcox—H. E. Wilcox Motor Co., Minneapolis, Minn.
Wilson—J. C. Wilson Co., Detroit, Mich.
Winther—Winther Motor Truck Co., Kenosha, Wis.
Witt-Will—Witt-Will Co., Inc., Washington, D. C.
Wolverine—American Commercial Car Co., Detroit, Mich.

Price List, Capacities and Inflation Pressures of Large Size Pneumatic Tires

	36 x 6			38 x 7			40 x 8			42 x 9			44 x 10		
	Price	Carrying Capacity	Inflation Pressure	Price	Carrying Capacity	Inflation Pressure	Price	Carrying Capacity	Inflation Pressure	Price	Carrying Capacity	Inflation Pressure	Price	Carrying Capacity	Inflation Pressure
Amazon Rubber Co., Akron, O.															
Amazon Cord, non-skid	98.60	2000	106	.....	....	...	.....	....	...	.....	....	...	.....	....	...
American Rubber & Tire Co., Akron, O.															
Americord, non-skid	109.45	....	...	154.25	....	...	198.75	....	...	.....	....	...	.....	....	...
Bergougnan Rubber Corp., Trenton, N. J.															
Bergougnan Cord, non-skid	112.00	2000	90	.....	....	...	189.75	3650	110	.....	....	...	.....	....	...
Braender Rubber & Tire Co., Rutherford, N. J.															
Braender Super Cord, non-skid	110.40	....	...	156.10	....	...	201.15	....	...	.....	....	...	.....	....	...
Brunswick-Balke-Collender Co., Chicago, Ill.															
Brunswick Cord, Skid-Not	98.50	....	...	139.25	....	...	179.50	....	...	.....	....	...	.....	....	...
Curtis Tire & Rubber Co., Muskegon, Mich.															
Curtis Cord, Road	93.05	....	...	.....	....	...	.....	....	...	.....	....	...	.....	....	...
Empire Tire & Rubber Co., Trenton, N. J.															
Empire Cord, Gray, non-skid	99.45	2000	90	140.65	2700	100	181.20	3650	110	.....	....	...	.....	....	...
Falls Rubber Co., Cuyahoga Falls, O.															
Falls Cord, Neverslip	112.00	2200	90	157.00	3000	100	200.00	4000	110	.....	....	...	.....	....	...
Federal Rubber Co. of Ill., Cudahy, Wis.															
*Federal Cord, non-skid	99.45	....	...	.....	....	...	.....	....	...	.....	....	...	.....	....	...
Firestone Tire & Rubber Co., Akron, O.															
Firestone Cord, non-skid	99.45	2200	90	140.65	3000	100	181.20	4000	110	226.95	5000	120	317.20	6000	130
Fisk Rubber Co., Chicopee Falls, Mass.															
Fisk Cord, non-skid	99.45	2200	90	140.65	3000	100	181.20	4000	110	.....	....	...	.....	....	...
General Tire & Rubber Co., Akron, O.															
General Cord, non-skid	106.25	2200	...	150.25	3000	...	193.65	4000	...	242.60	5000	...	338.90	6000	...
Goodrich, B. F. Rubber Co., Akron, O.															
Goodrich Cord, Ribbed	99.45	2200	90	140.65	3000	100	181.20	4000	110	.....	....	...	.....	....	...
Goodrich Cord, Safety	99.45	2200	90	140.65	3000	100	181.20	4000	110	.....	....	...	.....	....	...
Goodyear Tire & Rubber Co., Akron, O.															
Goodyear Cord, Ribbed	99.45	2000	90	140.65	2700	100	181.20	3650	110	.....	....	...	.....	....	...
Goodyear Cord, All-Weather	99.45	2000	90	140.65	2700	100	181.20	3650	110	226.95	4650	120	317.20	5800	130
Gordon Tire & Rubber Co., Canton, O.															
Truck Cord, non-skid	126.00	....	...	.....	....	...	.....	....	...	.....	....	...	.....	....	...
Hewitt Rubber Co., Buffalo, N. Y.															
Hewitt Cord, non-skid	109.45	1700	75	.....	....	...	.....	....	...	.....	....	...	.....	....	...
Howe Rubber Co., Inc., New Brunswick, N. J.															
Howe Ultra Cord, non-skid	109.80	....	...	.....	....	...	.....	....	...	.....	....	...	.....	....	...
India Tire & Rubber Co., Akron, O.															
India Cord, non-skid	108.30	....	...	.....	....	...	.....	....	...	.....	....	...	....	....	...
International India Rubber Corp., South Bend, Ind.															
Odell Cord, rough	68.00	....	...	.....	....	...	.....	....	...	.....	....	...	.....	....	...
Kelly-Springfield Tire Co., Cleveland, O.															
Kelly-Springfield Cord, grooved	120.00	....	...	160.00	....	...	200.00	....	...	.....	....	...	.....	....	...
Kelly-Springfield Cord, BB	120.00	....	...	160.00	....	...	200.00	....	...	.....	....	...	.....	....	...
McGraw Tire & Rubber Co., Cleveland, O.															
McGraw Cord, ribbed	99.45	....	...	.....	....	...	.....	....	...	.....	....	...	.....	....	...
McGraw Cord, non-skid	99.45	....	...	.....	....	...	.....	....	...	.....	....	...	.....	....	...
Marathon Tire & Rubber Co., Cuyahoga Falls, O.															
Marathon Cord, Angle	107.20	....	...	.....	....	...	.....	....	...	.....	....	...	.....	....	...
Mason Tire & Rubber Co., Kent, O.															
Mason Cord, non-skid	98.50	1700	100	139.30	2450	110	179.50	3300	120	.....	....	...	.....	....	...
Miller Rubber Co., Akron, O.															
Miller Cord, Geared-to-the-Road	104.70	2200	90	148.05	3000	100	190.75	4000	110	.....	....	...	.....	....	...
Mohawk Rubber Co., Akron, O.															
Mohawk Cord, non-skid	119.70	....	...	.....	....	...	.....	....	...	.....	....	...	.....	....	...
Norwalk Tire & Rubber Co., Norwalk, Conn.															
Norwalk Cord, non-skid	117.00	2000	90	.....	....	...	.....	....	...	.....	....	...	.....	....	...
Oldfield Tire Co., Cleveland, O.															
Oldfield Cord, anti-skid	104.42	2250	90	147.68	2880	100	190.26	3660	110	.....	....	...	.....	....	...
Pennsylvania Rubber Co., Jeannette, Pa.															
Vacuum Cup Cord	108.40	2200	90	153.35	3000	100	197.60	4000	110	.....	....	...	.....	....	...
Portage Rubber Co., Barberton, O.															
Portage Cord, Daisy	120.00	....	...	160.00	....	...	200.00	....	...	.....	....	...	.....	....	...
Racine Rubber Co., Racine, Wis.															
Racine Multi Mile Cord, non-skid	98.20	2200	90	138.90	3000	100	178.95	4000	110	.....	....	...	.....	....	...
Republic Rubber Co., Youngstown, O.															
Republic Grande Cord, Staggard Tread	111.60	2200	90	157.85	3000	100	202.50	4000	110	.....	....	...	.....	....	...
Star Rubber Co., Akron, O.															
Star Cord, "All Star"	120.00	2200	90	160.00	3000	100	200.00	4000	110	.....	....	...	.....	....	...
Sterling Tire Corp., Rutherford, N. J.															
Sterling Cord, non-skid	130.00	....	...	175.00	....	...	230.00	....	...	.....	....	...	.....	....	...
Sterling Spec. Cord, ribbed	130.00	....	...	175.00	....	...	230.00	....	...	.....	....	...	.....	....	...
Swinehart Tire & Rubber Co., Akron, O.															
Swinehart Cord, Hexagon	101.45	....	...	.....	....	...	.....	....	...	.....	....	...	.....	....	...
United States Tire Co., New York City.															
U. S. Nobby Cord	99.45	2200	90	140.65	3000	100	181.20	4000	110	226.95	5000	120	317.20	6000	130

*This price includes Government Excise Tax.

New Truck to be Built in St. Louis

ST. LOUIS, MO., Jan. 16.—St. Louis is to be the home of the new Eagle 2-ton truck which is to be built by the Eagle Motor Truck Corp. The truck will sell at $2000 and will be produced in a factory which is now in the process of construction.

The officers of the new organization are: T. R. Ayars, president; J. P. Reis, first vice-president; H. L. Yawitz, second vice-president; J. W. Hay, secretary, and R. E. Fitch, treasurer.

U. S. Truck to Expand

CINCINNATI, O., Jan. 20.—At a recent meeting of the stockholders of the United States Motor Truck Co., it was decided to increase the stock of the company from one million to two and one-half million dollars. The new issue was immediately oversubscribed by those stockholders who were present.

C. & C. Sales Corp., 1765 Broadway, New York City, has sent its president, I. R. Caplan, to Europe for the purpose of getting in closer touch with their foreign connections.

Commercial Body Company Buys Chevrolet Plant

ST. LOUIS, MO., Jan. 21.—According to announcement recently made by H. F. Cartwright, president, the Commercial Auto Body Co. has purchased the building and equipment of the St. Louis Mfg. Corp., a subsidiary of the General Motors Corp., which has been manufacturing bodies for Chevrolet cars. The old owners will continue production in the plant until their new factory is ready for production. The Commercial company plans to build 300 truck and 200 passenger car bodies daily once.

Reports of Divisions to Standards Committee on the Subjects Proposed for S. A. E. Standardization

Annular Ball Bearings

Separable Type

The standard for the separable or open type of annular ball bearings accepted by the Society in April, 1919, page 29ca, S. A. E. Handbook, Vol. I, did not include tolerances. The following inch tolerances for the annular ball bearings of the separable type are now recommended for adoption as S. A. E. standard:

Bore	+ 0.0000, — 0.0005 in.
Outside diam.	+ 0.0005, — 0.0000 in.
Eccentricity	
Inner race	0.0006 in.
Outer race	0.0012 in.

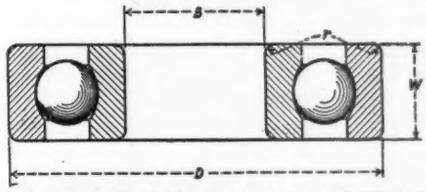
Extra Large Type

The Division is now working on tolerances for these bearings. The Division presents the accompanying proposals for adoption as S. A. E. Standards. The extra light series has been referred back to the Division for further consideration.

DIMENSIONS FOR LIGHT SERIES EXTRA LARGE TYPE BEARINGS

No.	B		D		W of Individual Rings		r Corner Radius	
	Mm.	In.	Mm.	In.	Mm.	In.	Mm.	In.
224	120	4.7244	215	8.4646	42	1.6535	3	0.12
226	130	5.1181	230	9.0551	46	1.8110	3	0.12
228	140	5.5118	250	9.8425	50	1.9685	3	0.12
230	150	5.9055	270	10.6299	54	2.1260	4	0.16
232	160	6.2992	290	11.4173	58	2.2835	4	0.16
234	170	6.6929	310	12.2047	62	2.4409	4	0.16
236	180	7.0866	330	12.9921	66	2.5984	4	0.16
238	190	7.4803	350	13.7795	70	2.7559	4	0.16
240	200	7.8740	370	14.5669	74	2.9134	5	0.20
242	210	8.2677	390	15.3543	78	3.0709	5	0.20

NOTE.—For temperature of measurement and definition of eccentricity, see page 29cc, S. A. E Handbook, Vol. I.



DIMENSIONS FOR MEDIUM SERIES EXTRA LARGE TYPE BEARINGS

No.	B		D		W of Individual Rings		r Corner Radius	
	Mm.	In.	Mm.	In.	Mm.	In.	Mm.	In.
324	120	4.7244	260	10.2362	55	2.1654	4	0.16
326	130	5.1181	280	11.0236	59	2.3228	4	0.16
328	140	5.5118	300	11.8110	63	2.4803	4	0.16
330	150	5.9055	320	12.5984	67	2.6378	4	0.16
332	160	6.2992	340	13.3858	71	2.7953	5	0.20
334	170	6.6929	360	14.1732	75	2.9528	5	0.20
336	180	7.0866	380	14.9606	79	3.1102	5	0.20
338	190	7.4803	400	15.7480	83	3 2677	5	0.20
340	200	7.8741	420	16.5354	87	3.4252	5	0.20
342	210	8.2677	440	17.3228	89	3.5039	5	0.20

NOTE.—For te nperature of measurement and definition of eccentricity, see page 29 cc, S. A. E Handbook, Vol. I

TOLERANCES FOR LIGHT AND MEDIUM SERIES

Bore	+0.0002, —0.0006 in.
Outside diameter	+0.0000, —0.0012 in.
Width of individual rings	+0.0000, —0.0050 in.
Eccentricity:	
Inner race	0.0012 in.
Outer race	0.0018 in.

Corner Radii Tolerances on Ball and Roller Bearings

It has come to the attention of the Division that trouble has been experienced, particularly in aeronautic work, owing to the rounding of the edges of the outer race not being a true quarter circle. It is therefore recommended that all corner radii in present standards for ball and roller bearings be specified as minimum radii.

Bracket Mounting for Generators

It is recommended that the present S. A. E. Standard for Bracket Mounting for Generators, page 36xc, S. A. E. Handbook, Vol. I, be revised so that the thread for the shaft-end will be 7-16 in.-20 S. A. E. instead of 7-16 in.-14 U. S. S., as the S. A. E. Standard thread is used in present practice instead of the U. S. Standard.

Flange Mountings for Generators

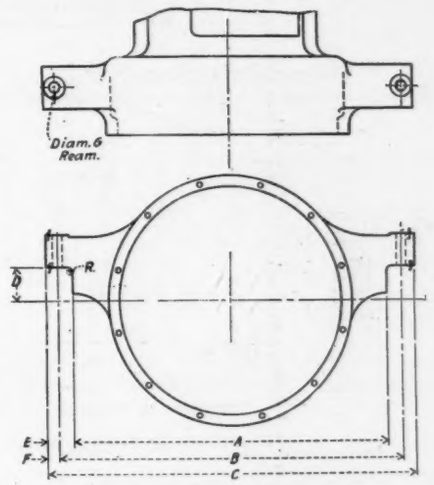
It is recommended that the present S. A. E. Standard for Flange Mounting for Generators, page 36c, S. A. E. Handbook, Vol. 1, be extended to specify the shaft-end as ½ in.-20 S. A. E. instead of the ½ inch as it is at the present time.

Engine Support Arms

In reference to the recommendation for the No. 2T size it was considered advisable to maintain 20 in. between the side-rails because this dimension is extensively used in present practice and any increase over 20 in. would materially affect the turning radius of the tractor, which is one of the most important factors in tractor design

As the present S. A. E. Recommended Practice for truck engine support arms, page 31b, S. A. E. Handbook, Vol. I, is now well established. It is recommended that it be adopted as S. A. E. Standard.

The proposed standard for engine support arms for the No. 1 and 2T flywheel housings for tractor practice is given below together with the present recommended practice for the Nos. 1, 2, 3 and 4 sizes for truck practice.



DIMENSIONS FOR TRUCK AND TRACTOR ENGINE SUPPORT ARMS

No.	A	B	C	D	E	F	G	R Max	Practice
1	23½	26¾	28½	2	2⅜	1	0.750	7/16	Truck and tractor
2	23½	24½	25¾	2½	1 5/16	⅝	0.625	⅜	Truck
2T	20	21¾	23½	3	1¾	⅞	0.625	¼	Truck and tractor

In tractor practice the support arms are generally bolted to the top of the side member and in truck practice to a sub-frame or to brackets mounted inside the side member.

Engine support arms No. 1 is intended for use on flywheel housing No 1, No 2 on flywheel housings No 2, 3 and 4, and No. 2T on flywheel housing No. 2.

Engine Testing Forms

As the present S. A. E. Standard for Engine Testing Forms is satisfactory for kerosene fuel engine testing it is recommended that a note be added to the forms stating that they are intended for all engines that are using either gasoline or kerosene for fuel.

Side-Lamp Glasses

The Lighting Division recommends for adoption as S. A. E. Standard the following series of side-lamp glass dimensions. The present standard tail-lamp glass is 3 in. diam. with tolerances of plus 1-32 in. or minus 1-64 in. The Division recommends changing these tolerances to conform with those recommended for head-lamp, side-lamp and spot-lamp glasses. The recommendation, together with the present standard for head-lamp glasses, is intended for automobile electric and oil-lamp glasses, including types such as semaphore, beehive and prism.

Dimensions for Side-Lamp Glasses

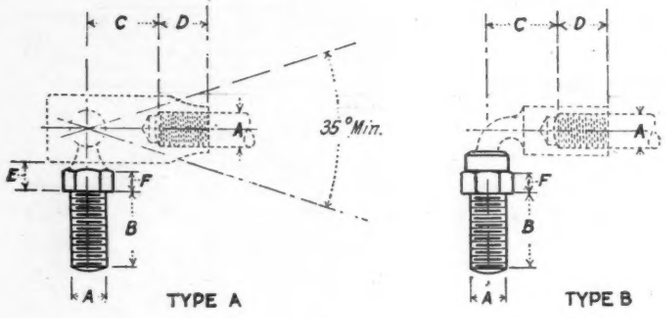
Outside Diameter of Lens Nom. Diam.	Tolerances	Minimum Light Opening in Door Nom. Diam.	Tolerances
2	+0,—1-32	1⅝	+0,—1-32
2½	+0,—1-32	2⅛	+0,—1-32
*3	+0,—1-32	2½	+0,—1-32
5	+ 1-32	4	+ 1-32
†6	+ 1-32	5	+ 1-32
7	+ 1-32	6	+ 1-32

Dimensions in inches.
*Also tail-lamp glass.
†Also spot-lamp glass.
Thickness of bevel edge for all sizes is ⅛ in., plus 1-32, minus 0. This is commonly known as double-thick American glass.
This standard is to become fully operative July 1, 1921.

Ball-and-Socket Joints

The Miscellaneous Division recommends for adoption as S. A. E. Standard the attendant dimensions for ball-and-socket joints. The tentative recommendation has been submitted to manufacturers and users and their criticism obtained. The proposed standard applies to the two most widely used types of ball-and-socket joints and the series of sizes proposed meets all general requirements for spark and throttle control.

Below: Proposed Standards for Ball-and-Socket Joints.



Dimensions for Ball-and-Socket Joints

A	Hex Min	B	C	D	E[1]	F[2] Min
No. 5-40	¼	9-32	¼	¼	7-32	3-32
No. 8-32	¼	11-32	11-32	5-16	7-32	7-64
No. 10-32	5-16	13-32	13-32	⅜	¼	⅛
12-32	⅜	15-32	7-16	⅜	¼	9-64
¼-28	⅜	9-16	½	7-16	9-32	5-32
5-16-24	7-16	23-32	⅝	9-16	9-32	3-16
⅜-24	9-16	⅞	¾	11-16	5-16	7-32
7-16-20	⅝	1	⅞	13-16	⅜	¼
½-20	¾	1⅛	1	15-16	7-16	9-32

[1]Minimum wrench clearance.
[2]F = ½A + 1-32.
Dimensions in inches.
All threads are S. A. E.

Dimensions for Brake-Shaft Bushings

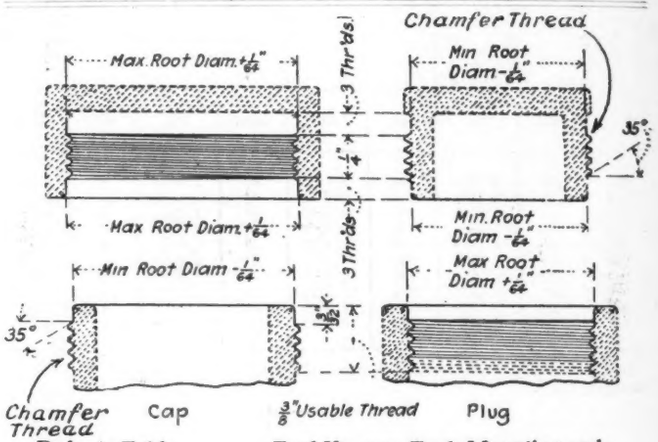
Inside Diameter[1]	Length	Inside Diameter[1]	Length	
¼	3-16	¼	⅞ 21-32	⅞
5-16	¼	5-16	15-16 11-16	15-16
⅜	9-32	⅜	1	¾ 1
7-16	5-16	7-16	1⅛	⅞ 1⅛
½	⅜	½	1¼ 15-16	1¼
9-16	7-16	9-16	1⅜ 1	1⅜
⅝	15-32	⅝	1½ 1⅛	1½
11-16	½	11-16	1⅝ 1¼	1⅝
¾	9-16	¾	1¾ 1 5-16	1¾
13-16	⅝	13-16	2 1½	2

Dimensions in inches.
Wall thickness: below 1¼ in. inside diameter, 1-32, 1-16, and ⅛ in.; above and including 1¼ in. inside diameter, 1-32, 1-16, ⅛ and 3-16 in.
[1]Inside diameter tolerances: below 1 in., + 0.001 or + 0.003 in.; above and including 1 in., + 0.001 or + 0.004 in.

Dimensions for Radiator and Fuel Tank Caps

Diameter	Pitch	Diameter	Pitch	Diameter	Pitch	Diameter	Pitch
1	20	1½	18	2¼	16	3	16
1⅛	18	1¾	16	2½	16	3½	16
1¼	18	2	16	2¾	16	4	16
1⅜	18						

*Recess or neck is optional.
Corner radii are 1-32 in.
All threads are S. A. E. Fine.



Refer to Table Above in Connection With Diagram.

Fuel Vacuum Tank Mounting and Connections

It will be noted that the pipe-line connections for the vacuum pipe and the gasoline inlets and outlets are specified as Briggs standard tapered pipe threads and conform to S. A. E. Recommended Practice for carburetor fittings, pages 35a and 35b, S. A. E. Handbook, Vol. I.

The Miscellaneous Division therefore recommends for adoption as S. A. E. Standard the fuel vacuum tank mountings and pipe connections in drawing and table. See illustration on page 77.

Fuel Vacuum Tank Mountings and Connections

Tank Diameter, In.	[1]Gasoline Inlet	[1]Gasoline Outlet	A	B	C
3¾ and 4½	⅛	⅛	4	4	2½
6	⅛	¼	4	4	2½
"D" type	¼	¼	7¼	4	2½

All dimensions are in inches.
[1]Pipe-line connections and plugs are Briggs standard taper pipe threads.

Brake-Shaft Bushings

The Division recommends for adoption as S. A. E. Recommended Practice the following sizes of brake-shaft bushings. This subject was suggested as suitable for standardization by a manufacturer of oilless bearings, as practically every automobile builder specifies a different size bushing for brake-shaft rods, necessitat- was obtained from the industry showing ing making these parts to order. Data sizes of bushings in use and the Subdivision presents the attendant recommendation as great reductions.

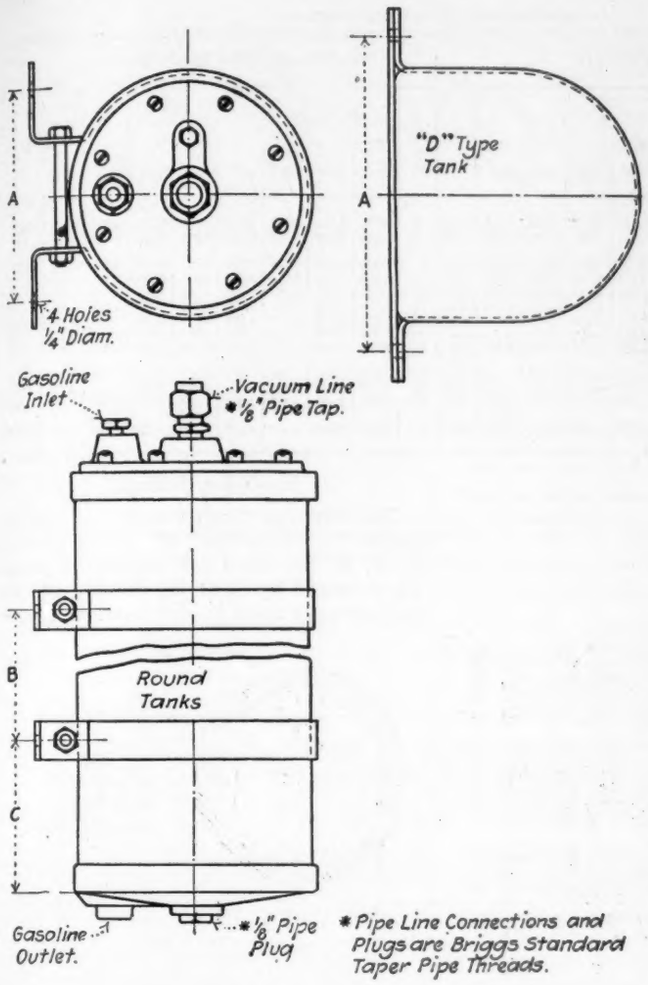
Tank and Radiator Caps

The Division recommends for adoption as S. A. E. Recommended Practice the following cap and plug types of tank and radiator caps. No thread tolerances are proposed by the Division, as it is desired to base them on the final report of the National Screw Thread Commission. A counterbore of 3 threads is specified for the cap in order to allow sufficient clearance for tapping.

This proposal is based on the recommendation made at the June, 1919, meeting of the Standards Committee, when it was referred back to the Division for further consideration. It was the consensus of opinion that the S. A. E. Standard fine threads should be specified rather than 16 U. S. Standard pitch for all sizes and that the ⅛ in. sizes should be eliminated.

Tire and Rim Division, Rim Sections and Contours for Pneumatic Tires

The 5-in. rim section dimensions referred to on page 59 of the report have been worked out by the Tire and Rim Association and are presented above for adoption as S. A. E. Standard.



The following note explaining how the detail dimensions for the medium and light series are determined is a part of the present recommendation:

The medium series of roller transmission chains for any pitch shall use the roller, bushing and pin dimensions for the next shorter pitch of the heavy series. The light series of any given pitch shall use the roller, bushing and pin dimensions for the second shorter pitch of the heavy series.

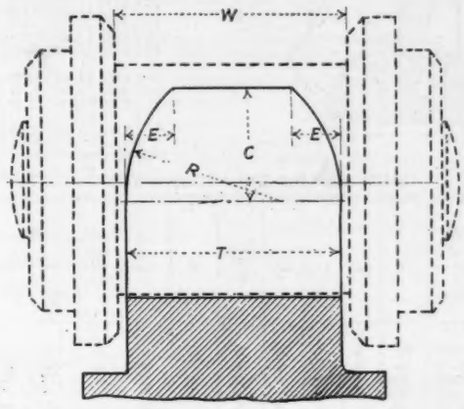
The Roller Chain Division therefore recommends that the accompanying dimensions be adopted as S. A. E. Recommended Practice for Heavy Roller Transmission Chains.

Roller Transmission Chains

The present S. A. E. Recommended Practice for Roller Chain Dimensions was adopted by the Society in January, 1918, as a temporary means of unifying practice with the least disturbance to the industry during the war. The Committee on Roller Transmission Chains of the American Chain Division of Mechanical Engineers, and the Division has prepared the following recommendation for adoption as permanent practice.

Roller Transmission Chain Sprockets

The joint committee has not completed its recommendation for sprocket tooth forms, as it wishes to give further consideration to both American and British practice. The following sectional profile showing the chamfer of sprocket teeth and clearances of the inside plates of the chain is presented for adoption as S. A. E. Recommended Practice and will be completed later in a report covering recommendations for sprocket tooth forms and outside diameters.



Formulas.

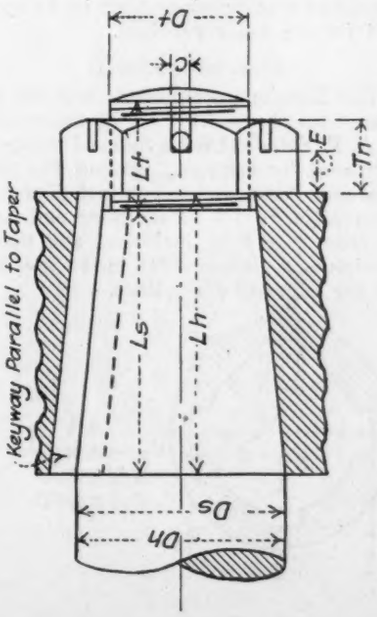
P=Pitch of Chain
W=Chain Width
T=0.93W-0.005"
C=0.3P
E=P/6
R(Min.)=043P
Limits for T=
±(001W+0002")

SECTION PROFILE SHOWING CHAMFER OF SPROCKET TEETH

Pitch	C	E	Pitch	C	E
⅜	0.113	3/64	1⅜	0.525	7/32
½	0.150	1/16	2	0.600	¼
⅝	0.1875	5/64	2½	0.750	5/16
¾	0.225	3/32	3	0.900	⅜
1	0.300	⅛	4	1.200	½
1¼	0.375	5/32	5	1.500	⅝
1½	0.450	3/16			

Taper Fittings With Plain Nuts

The Division recommends that the present S. A. E. Standard for Taper Fittings with Plain Nuts be withdrawn, as the use of plain nuts with taper fittings has been discontinued in practice in favor

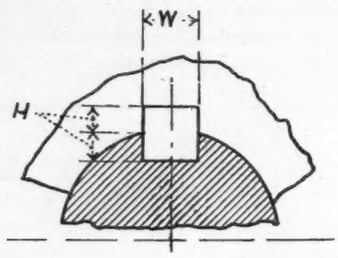


HEAVY ROLLER TRANSMISSION CHAIN DIMENSIONS

Pitch	Roll Diameter	Pin Diameter	Thickness of Inside Plates	W—Chain Widths Minumen		T—Sprocket Thickness		Measuring Load, Lb.	Approx. Test Load, Lb.	Lower Limits Bottom Diam. Sprockets
				Narrow	Wide	Narrow	Wide			
*⅜	0.250 (¼)	0.125 (⅛)	0.050	0.156 (5/32)	0.250 (¼)	0.139±0.003	0.227±0.004	14	464	0.004
*½	0.3125 (5/16)	0.156	0.060	0.219 (7/32)	0.3125 (5/16)	0.198±0.004	0.284±0.005	25	825	0.006
*⅝	*0.400	*0.200	*0.080	*0.250 (¼)	*0.375 (⅜)	0.226±0.005	0.343±0.006	39	1280	0.007
*¾	*0.469 (15/32)	0.234 (15/64)	0.094 (3/32)0	*0.3125 (5/16)	*0.500 (½)	0.284±0.005	0.459±0.007	56	1850	0.009
*1	*0.625	*0.3125	0.125 (⅛)	0.4375 (7/16)	*0.625 (⅝)	0.401±0.006	0.575±0.008	100	3300	0.012
*1¼	0.781 (25/32)	*0.375	*0.156 (5/32)	0.500 (½)	0.781 (25/32)	0.459±0.007	0.720±0.010	156	5150	0.015
*1½	0.937 (15/16)	0.469 (15/32)	0.1875 (3/16)	0.625 (⅝)	*1.000	0.575±0.008	0.924±0.012	225	7430	0.018
*1¾	1.100	0.517 (33/64)	*0.220	0.750 (¾)	1.125 (1⅛)	0.692±0.010	1.040±0.013	325	10700	0.021
*2	1.250	0.625	*0.250 (¼)	0.875 (⅞)	*1.250 (1¼)	0.808±0.011	1.156±0.013	400	13200	0.024
*2½	1.550	0.781 (25/32)	0.3125 (5/16)	†	1.5625 (1 5/16)	†	1.389±0.017	625	20600	0.030
3	1.900	0.9375 (1 15/16)	0.375 (⅜)	†	1.875 (1⅞)	†	1.738±0.021	900	29700	0.036
4	2.500	1.250	0.500 (½)	†	2.500 (2½)	†	2.319±0.027	1600	52800	0.048
5	3.000	1.500	0.625 (⅝)	†	3.000	†	2.784±0.032	2500	82500	0.060
Formulas	Approx. ⅝P	Approx. ½ roll diam.	⅛ P	Approx. 0.41 P	Approx. 0.625 P	(0.93W−0.06)±(0.01W +0.002)		100P²	Approx. 3300 P² or ½ breaking strength	0.012P

*Denotes manufacturers' standards in present use.
†There will be no narrow chain specification for these pitches. ‡The use wide chains for all pitches is considered preferable.

of the use of castle nuts, which is better engineering practice. The present standard for taper fittings with plain nuts corresponds to the present standard for taper fittings with castle nuts except that the latter standard specifies that a castle nut shall be used instead of a plain nut.



DIMENSIONS FOR 4-SPLINE SHAFT FITTINGS

4A—PERMANENT FIT										4B—TO SLIDE WHEN NOT UNDER LOAD									
Nom Diam	D		d		w		h		T[1]	Nom Diam	D		d		w		h		T[1]
	max	min	max	min	max	min	max	min			max	min	max	min	max	min	max	min	
¾	0.750	0.749	0.637	0.636	0.181	0.179	0.056	0.055	78	¾	0.750	0.749	0.562	0.561	0.181	0.179	0.094	0.093	123
⅞	0.875	0.874	0.744	0.743	0.211	0.209	0.066	0.065	107	⅞	0.875	0.874	0.656	0.655	0.211	0.209	0.109	0.108	167
1	1.000	0.999	0.850	0.849	0.241	0.239	0.075	0.074	139	1	1.000	0.999	0.750	0.749	0.241	0.239	0.125	0.124	219
1⅛	1.125	1.124	0.956	0.955	0.271	0.269	0.084	0.083	175	1⅛	1.125	1.124	0.844	0.843	0.271	0.269	0.141	0.140	277
1¼	1.250	1.249	1.062	1.061	0.301	0.299	0.094	0.093	217	1¼	1.250	1.249	0.937	0.936	0.301	0.299	0.156	0.155	341
1⅜	1.375	1.374	1.169	1.168	0.331	0.329	0.103	0.102	262	1⅜	1.375	1.374	1.031	1.030	0.331	0.329	0.172	0.171	414
1½	1.500	1.499	1.275	1.274	0.361	0.359	0.112	0.111	311	1½	1.500	1.499	1.125	1.124	0.361	0.359	0.187	0.186	491
1⅝	1.625	1.624	1.381	1.380	0.391	0.389	0.122	0.121	367	1⅝	1.625	1.624	1.219	1.218	0.391	0.389	0.203	0.202	577
1¾	1.750	1.749	1.487	1.486	0.422	0.420	0.131	0.130	424	1¾	1.750	1.749	1.312	1.311	0.422	0.420	0.219	0.218	670
2	2.000	1.998	1.700	1.698	0.482	0.479	0.150	0.148	555	2	2.000	1.998	1.500	1.498	0.482	0.479	0.250	0.248	875
2¼	2.250	2.248	1.912	1.910	0.542	0.539	0.169	0.167	703	2¼	2.250	2.248	1.687	1.685	0.542	0.539	0.281	0.279	1106
2½	2.500	2.498	2.125	2.123	0.602	0.599	0.187	0.185	865	2½	2.500	2.498	1.875	1.873	0.602	0.599	0.312	0.310	1365
3	3.000	2.998	2.550	2.548	0.723	0.720	0.225	0.223	1249	3	3.000	2.998	2.250	2.248	0.723	0.720	0.375	0.373	1969

DIMENSIONS FOR TAPERFITTINGS WITH CASTLE NUTS

Nom Diam	Diam. of Shaft Ds		Diam. of Hole Dh		Ls	Lh	Lt	Dt	Thds. per In.	E	Tn	Short Diam. of Nut	W		H		Square Key		C
	max	min	max	min									max	min	max	min	max	min	
¼	0.250	0.249	0.248	0.247	5/16	⅜	5/16	3/16	32	1/32	¼	9/32	0.0625	0.0615	0.0342	0.0327	0.0635	0.0630	1/32
⅜	0.375	0.374	0.373	0.372	5/16	½	7/16	5/16	24	1/16	⅜	½	0.0937	0.0927	0.0499	0.0484	0.0947	0.0942	1/64
½	0.500	0.499	0.498	0.497	11/16	¾	7/16	5/16	24	1/16	⅜	½	0.1250	0.1240	0.0655	0.0640	0.1260	0.1255	1/64
⅝	0.625	0.624	0.623	0.622	11/16	¾	½	½	20	¼	5/16	¾	0.1562	0.1552	0.0811	0.0796	0.1572	0.1567	1/8
¾	0.750	0.749	0.748	0.747	13/16	1	½	½	20	¼	5/16	¾	0.1875	0.1865	0.0968	0.0953	0.1885	0.1880	1/8
⅞	0.875	0.874	0.873	0.872	1⅛	1¼	⅝	⅝	20	5/16	½	1	0.2500	0.2490	0.1280	0.1265	0.2510	0.2505	1/32
1	1.001	0.999	0.997	0.995	1⅜	1½	⅝	¾	20	5/16	½	1	0.2500	0.2490	0.1280	0.1265	0.2510	0.2505	1/32
1⅛	1.126	1.124	1.122	1.120	1⅜	1½	⅝	¾	20	5/16	½	1	0.3125	0.3115	0.1615	0.1590	0.3140	0.3130	1/32
1¼	1.251	1.249	1.247	1.245	1⅜	1½	⅝	1	20	5/16	½	1½	0.3125	0.3115	0.1615	0.1590	0.3140	0.3130	1/32
1⅜	1.376	1.374	1.372	1.370	1⅜	2	⅝	1	20	5/16	½	1½	0.3750	0.3740	0.1930	0.1905	0.3765	0.3755	1/32
1½	1.501	1.499	1.497	1.495	1⅜	2	⅝	1	20	5/16	½	1½	0.3750	0.3740	0.1930	0.1905	0.3765	0.3755	1/32
1¾	1.751	1.749	1.747	1.745	2⅛	2½	¾	1¼	18	7/16	⅝	2⅛	0.4375	0.4365	0.2242	0.2217	0.4390	0.4380	3/32
2	2.001	1.999	1.997	1.995	2⅜	3	¾	1¼	18	7/16	⅝	2⅛	0.5000	0.4990	0.2555	0.2530	0.5015	0.5005	3/32
2¼	2.252	2.248	2.245	2.242	2⅜	3	¾	1¼	18	7/16	⅝	2⅛	0.5625	0.5610	0.2962	0.2912	0.5645	0.5630	3/32
2½	2.502	2.498	2.495	2.492	3⅜	3½	1⅛	2	16	⅝	1	3⅛	0.6250	0.6235	0.3275	0.3225	0.6270	0.6255	3/32
2¾	2.752	2.748	2.745	2.742	3⅜	3½	1⅛	2	16	⅝	1	3⅛	0.6875	0.6860	0.3587	0.3537	0.6895	0.6880	3/32
3	3.002	2.998	2.995	2.992	3⅜	4	1⅛	2	16	⅝	1	3⅛	0.7500	0.7485	0.3900	0.3850	0.7520	0.7505	3/32
3½	3.502	3.498	3.495	3.492	4⅜	4½	1¼	2½	14	¾	1⅛	3⅞	0.8750	0.8735	0.4525	0.4475	0.8770	0.8755	3/32
4	4.002	3.998	3.995	3.992	5⅜	5½	1¼	2½	14	¾	1⅛	3⅞	1.0000	0.9985	0.5150	0.5100	1.0020	1.0005	3/32

Dimensions in inches.
Taper per foot=1.495 to 1.505 in.

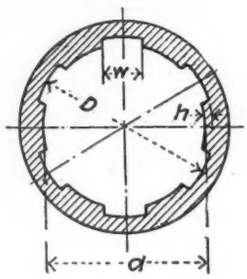
The Division has therefore recommended that the limits for the width of keyway "W" for the S. A. E. Standard for Taper Fittings with Castle Nuts be increased by 0.0005 in. for the nominal diameters from ¼ to ⅞ in., making the total tolerance 0.001 in.; that the limits for the depth of the keyway be increased by 0.0005 in. for the nominal diameters from ¼ in. to and including 2 in.; and that tolerance of plus or minus 0.005 in. be specified for the taper per foot.

Four-Spline Fittings

The Division recommends that the tolerance for the width "W" of the present S. A. E. Standard for 4-Spline Fittings be increased by 0.001 in., making the total tolerance 0.002 in. for nominal diameters from ¾ in. to 1¾ in. inclusive and 0.003 in. from 2 to 3 in. inclusive; and that a maximum radius of 0.015 in. be specified for the edges of the splines.

Six-Spline Fittings

The Division recommends that the tolerance for the width "W" of the present S. A. E. Standard for 6-Spline Fittings be increased by 0.001 in., making the total tolerance 0.002 in. for nominal diame

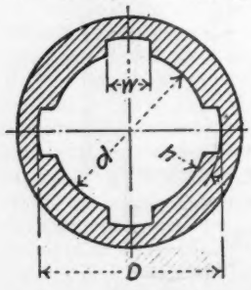


6A
w = 0.250D
h = 0.050D
d = 0.900D

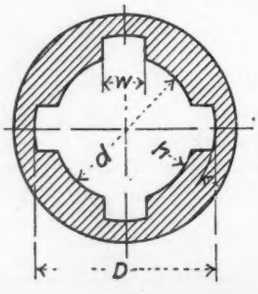
DIMENSIONS FOR 6-SPLINE SHAFT FITTINGS

6A—PERMANENT FIT								6B—TO SLIDE WHEN NOT UNDER LOAD								6C—TO SLIDE WHEN UNDER LOAD							
Nom Diam	D		d		w		T[1]	Nom Diam	D		d		w		T[1]	Nom Diam	D		d		w		T[1]
	max	min	max	min	max	min			max	min	max	min	max	min			max	min	max	min	max	min	
¼	0.750	0.749	0.675	0.674	0.188	0.186	80	¾	0.750	0.749	0.638	0.637	0.188	0.186	117	¾	0.750	0.749	0.600	0.599	0.188	0.186	152
⅜	0.875	0.874	0.788	0.787	0.219	0.217	109	⅞	0.875	0.874	0.744	0.743	0.219	0.217	159	⅞	0.875	0.874	0.700	0.699	0.219	0.217	207
1	1.000	0.999	0.900	0.899	0.250	0.248	143	1	1.000	0.999	0.850	0.849	0.250	0.248	208	1	1.000	0.999	0.800	0.799	0.250	0.248	270
1⅛	1.125	1.124	1.013	1.012	0.281	0.279	180	1⅛	1.125	1.124	0.956	0.955	0.281	0.279	263	1⅛	1.125	1.124	0.900	0.899	0.281	0.279	342
1¼	1.250	1.249	1.125	1.124	0.313	0.311	223	1¼	1.250	1.249	1.063	1.062	0.313	0.311	325	1¼	1.250	1.249	1.000	0.999	0.313	0.311	421
1⅜	1.375	1.374	1.238	1.237	0.344	0.342	269	1⅜	1.375	1.374	1.169	1.168	0.344	0.342	393	1⅜	1.375	1.374	1.100	1.099	0.344	0.342	510
1½	1.500	1.499	1.350	1.349	0.375	0.373	321	1½	1.500	1.499	1.275	1.274	0.375	0.373	468	1½	1.500	1.499	1.200	1.199	0.375	0.373	608
1⅝	1.625	1.624	1.463	1.462	0.406	0.404	376	1⅝	1.625	1.624	1.381	1.380	0.406	0.404	550	1⅝	1.625	1.624	1.300	1.299	0.406	0.404	713
1¾	1.750	1.749	1.575	1.574	0.438	0.436	436	1¾	1.750	1.749	1.488	1.487	0.438	0.436	637	1¾	1.750	1.749	1.400	1.399	0.438	0.436	827
2	2.000	1.998	1.800	1.798	0.500	0.497	570	2	2.000	1.998	1.700	1.698	0.500	0.497	833	2	2.000	1.998	1.600	1.598	0.500	0.497	1080
2¼	2.250	2.248	2.025	2.023	0.563	0.560	721	2¼	2.250	2.248	1.913	1.912	0.563	0.560	1052	2¼	2.250	2.248	1.800	1.798	0.563	0.560	1367
2½	2.500	2.498	2.250	2.248	0.625	0.622	891	2½	2.500	2.498	2.125	2.123	0.625	0.622	1300	2½	2.500	2.498	2.000	1.998	0.625	0.622	1688
3	3.000	2.998	2.700	2.698	0.750	0.747	1283	3	3.000	2.998	2.550	2.548	0.750	0.747	1873	3	3.000	2.998	2.400	2.398	0.750	0.747	2430

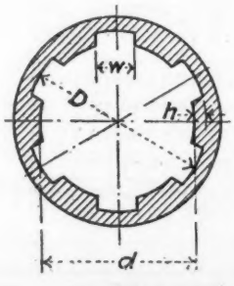
Dimensions in inches.
Radii on edges of splines not to exceed 0.015 in.
Splines shall not be more than 0.006 in. per ft. out of parallel with respect to the a is of the shaft.
[1]Torque=1000x 6x mean Rxhx1=pound-inches torque capacity per inch of bearing length at 1000 lb. pressure per sq. in. on side of splines
No allowance is made for radii on edges or for clearances.



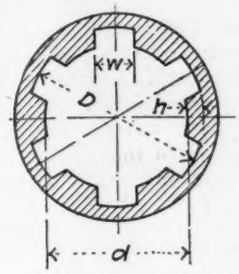
4A
w = 0.241D
h = 0.075D
d = 0.850D



4B
w = 0.241D
h = 0.125D
d = 0.750D



6B
w = 0.250D
h = 0.075D
d = 0.850D



6C
w = 0.250D
h = 0.100D
d = 0.800D

ters from ¾ to 1¾ in. inclusive and 0.003 in. from 2 to 3 in. inclusive; and that a maximum radius of 0.015 in. be specified for the edges of the splines.

DIMENSIONS FOR 16-SPLINE SHAFT FITTINGS

16A—PERMANENT FIT								16B—TO SLIDE WHEN NOT UNDER LOAD								16C—TO SLIDE WHEN UNDER LOAD							
Nom Diam	D		d		w		T[1]	Nom Diam	D		d		w		T[1]	Nom Diam	D		d		w		T[1]
	max	min	max	min	max	min			max	min	max	min	max	min			max	min	max	min	max	min	
2	2.000	1.997	1.820	1.817	0.196	0.193	1375	2	2.000	1.997	1.720	1.717	0.196	0.193	2083	2	2.000	1.997	1.620	1.617	0.196	0.193	2751
2½	2.500	2.497	2.275	2.273	0.245	0.242	2149	2½	2.500	2.497	2.150	2.147	0.245	0.242	3255	2½	2.500	2.497	2.025	2.022	0.245	0.242	4299
3	3.000	2.997	2.730	2.727	0.294	0.291	3094	3	3.000	2.997	2.580	2.577	0.294	0.291	4687	3	3.000	2.997	2.430	2.427	0.294	0.291	6190
3½	3.500	3.497	3.185	3.182	0.343	0.340	4212	3½	3.500	3.497	3.010	3.007	0.343	0.340	6378	3½	3.500	3.497	2.835	2.832	0.343	0.340	8426
4	4.000	3.997	3.640	3.637	0.392	0.389	5501	4	4.000	3.997	3.440	3.437	0.392	0.389	8333	4	4.000	3.997	3.240	3.237	0.392	0.389	11005
4½	4.500	4.497	4.095	4.092	0.441	0.438	6962	4½	4.500	4.497	3.870	3.867	0.441	0.438	10546	4½	4.500	4.497	3.645	3.642	0.441	0.438	13928
5	5.000	4.997	4.550	4.547	0.490	0.487	8595	5	5.000	4.997	4.300	4.297	0.490	0.487	13020	5	5.000	4.997	4.050	4.047	0.490	0.487	17195
5½	5.500	5.497	5.005	5.002	0.539	0.536	10395	5½	5.500	5.497	4.730	4.727	0.539	0.536	15754	5½	5.500	5.497	4.455	4.452	0.539	0.536	20806
6	6.000	5.997	5.460	5.457	0.588	0.585	12377	6	6.000	5.997	5.160	5.157	0.588	0.585	18749	6	6.000	5.997	4.860	4.857	0.588	0.585	24760

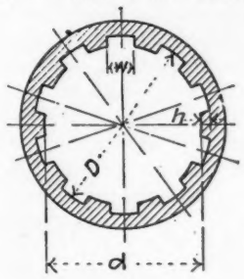
Dimensions in inches.
Radii on corner of splines not to exceed 0.015 in.
Splines at all not be more than 0.006 in. per ft. out of parallel with respect to the axis of the shaft.
[1]Torque = 1000x16x mean Rxhxf = pound-inches torque capacity per inch of bearing length at 1000 lb. pressure per sq. in. on sides of splines. No allowance is made for radii on edges or for clearances.

DIMENSIONS FOR 10-SPLINE SHAFT FITTINGS

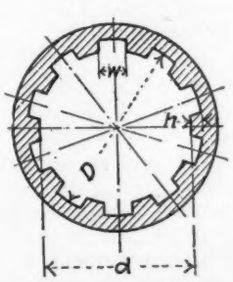
10A—PERMANENT FIT								10B—TO SLIDE WHEN NOT UNDER LOAD								10C—TO SLIDE WHEN UNDER LOAD							
Nom Diam	D		d		w		T[1]	Nom Diam	D		d		w		T[1]	Nom Diam	D		d		w		T[1]
	max	min	max	min	max	min			max	min	max	min	max	min			max	min	max	min	max	min	
¾	0.750	0.749	0.683	0.682	0.117	0.115	120	¾	0 750	0.749	0.645	0.644	0.117	0.115	183	¾	0.750	0.749	0.603	0.607	0.117	0.115	241
⅞	0.875	0.874	0.796	0.795	0.137	0.135	165	⅞	0.875	0.874	0.753	0.752	0.137	0.135	248	⅞	0.875	0.874	0.709	0.708	0.137	0.135	329
1	1.000	0.999	0.910	0.909	0.156	0.154	215	1	1.000	0.999	0 860	0.859	0.156	0.154	326	1	1.000	0.999	0.810	0.809	0.156	0.154	430
1⅛	1.125	1.124	1.024	1.023	0.176	0.174	271	1⅛	1.125	1.124	0.968	0.967	0.176	0.174	412	1⅛	1.125	1.124	0.911	0.910	0.176	0.174	545
1¼	1.250	1.249	1.138	1.137	0.195	0.193	336	1¼	1.250	1.249	1.075	1.074	0.195	0.193	503	1¼	1.250	1.249	1.013	1.012	0.195	0.193	672
1⅜	1.375	1.374	1.251	1.250	0.215	0.213	406	1⅜	1.375	1.374	1.183	1.182	0.215	0.213	614	1⅜	1.375	1.374	1.114	1.113	0.215	0.213	813
1½	1.500	1.499	1.365	1.364	0.234	0.232	483	1½	1.500	1.499	1.290	1.289	0.234	0.232	732	1½	1.500	1.499	1.215	1.214	0.234	0.232	967
1⅝	1.625	1.624	1.479	1.478	0.254	0.252	566	1⅝	1.625	1.624	1.398	1.397	0.254	0.252	860	1⅝	1.625	1.624	1.316	1.315	0.254	0.252	1135
1¾	1.750	1.749	1.593	1.592	0.273	0.271	658	1¾	1.750	1.749	1.505	1.504	0.273	0.271	997	1¾	1.750	1.749	1.418	1.417	0.273	0.271	1316
2	2.000	1.998	1.820	1.818	0.312	0.309	860	2	2.000	1.998	1.720	1.718	0.312	0.309	1302	2	2.000	1.998	1.620	1.618	0.312	0.309	1720
2¼	2.250	2.248	2.048	2.046	0.351	0.348	1088	2¼	2.250	2.248	1.935	1.933	0.351	0.348	1647	2¼	2.250	2.248	1.823	1.821	0.351	0.348	2176
2½	2.500	2.498	2.275	2.273	0.390	0.387	1343	2½	2.500	2.498	2.150	2.148	0.390	0.387	2034	2½	2.500	2.498	2.025	2.023	0.390	0.387	2683
3	3.000	2.998	2.730	2.728	0.468	0.465	1934	3	3.000	2.998	2.580	2.578	0.468	0.465	2929	3	3.000	2.998	2.430	2.428	0.468	0.465	3869
3½	3.500	3.497	3.185	3.182	0.546	0.543	2632	3½	3.500	3.497	3.010	3.007	0.546	0.543	3987	3½	3.500	3.497	2.835	2.832	0.546	0.543	5266
4	4.000	3.997	3.640	3.637	0.624	0.621	3438	4	4.000	3.997	3.440	3.437	0.624	0.621	5203	4	4.000	3.997	3.240	3.237	0.624	0 621	6878
4½	4.500	4.497	4.095	4.092	0.702	0.699	4351	4½	4.500	4.497	3.870	3.867	0.702	0.699	6591	4½	4.500	4.497	3.645	3.642	0.702	0.699	8705
5	5.000	4.997	4.550	4.547	0.780	0.777	5371	5	5.000	4.997	4.300	4.297	0.780	0.777	8137	5	5.000	4.997	4.050	4.047	0.780	0.777	10746
5½	5.500	5.497	5.005	5.002	0.858	0.855	6500	5½	5.500	5.497	4.730	4.727	0.858	0.855	9846	5½	5.500	5 497	4.455	4.452	0.858	0.855	13003
6	6.000	5.997	5.460	5.457	0.936	0.933	7735	6	6.000	5.997	5.160	5.157	0.936	0.933	11718	6	6.000	5.997	4.860	4.857	0.936	0.933	15475

Ten-Spline Fittings

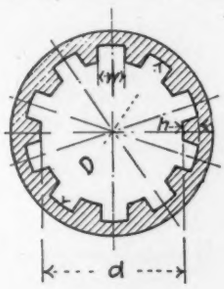
The Division recommends that the tolerance for the width "W" of the present S. A. E. Standard for 10-Spline Fittings be increased by 0.001 in., making the total tolerance 0.002 in. for nominal diameters from ¾ to 1¾ in. inclusive and 0.003 in. from 2 to 3 in. inclusive; that a maximum radius of 0.015 in. be specified for the edges of the splines; and that the standard be extended to include 6 in. and intermediate nominal diameters.



10A
w = 0.156D
h = 0.045D
d = 0.910D



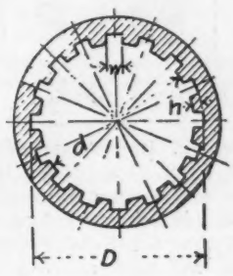
10B
w = 0.156D
h = 0.070D
d = 0.860D



10C
w = 0.156D
h = 0.095D
d = 0.810D

Sixteen-Spline Fittings

Twelve-spline fittings in diameters up to and including 5 in. have been used to a limited extent in the automotive industry. The Shaft Fittings Division does not wish to encourage the use of a fitting with the number of splines only slightly more than those of the 10-spline fitting, and therefore proposes for adoption the following 16-spline fitting, which is considered preferable to a 12-spline fitting. The 16-spline fitting will permit greater shaft strength, owing to the a 10 or 12-spline fitting.



16A
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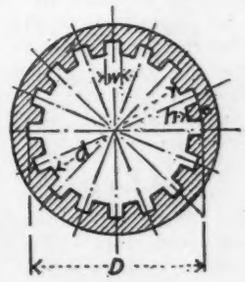
h = 0.045D
d = 0.910D



16B
w = 0.098D
h = 0.070D
d = 0.860D

16C
w = 0.098D
h = 0.095D
d = 0.810D

Pneumatic Tires for Passenger Cars and Commercial Cars

It has been proposed in the Tire and Rim Division that the present S. A. E. Standard for Pneumatic Tires for Passenger Cars and Commercial Vehicles be revised to include 33 x 4½ and 34 x 5 in. pneumatic tire sizes in order to meet the growing demand for 24 in. wheels with 4½ and 5-in. tires.

At the meeting of members of the Tire and Rim Division on Nov. 20, it was recommended to adopt the proposal subject to final approval by the Subdivision on Pneumatic Tires and the Division after the proposal had been considered by the Rubber Association of America and the Tire and Rim Association.

Nominal Tire and Rim Size		Oversize Tire		Tire Seat Diam. (Rim)	
In.	Mm.	In.	Mm.	In.	Mm.
33x4½	120/610	34x5	135/610	24	610
34x5	135/610	36x6	150/610	24	610
*40x8	200/610	42x9	225/610	24	610
42x9	225/610	.....	.....	24	610

*The 40x8 in. tire is already standard for regular equipment, but is submitted for approval of the 42x9 in. tire as oversize equipment.

The Tire and Rim Association at its meeting on Dec. 10 approved the insertion of the above sizes in the standard and also included the 42 x 9 in. size. It is expected that the Rubber Association of America will also approve the proposal, including the 42 x 9 in. The present S. A. E. Recommended Practice for the carrying capacity and inflation pressure of the 9-in. tire is 5000 lb. and 120 lb. per sq. in., respectively.

The following addition to the present standard as submitted to the Division members for their letter ballot at the time of printing this report is submitted to the Standards Committee for consideration and approval. All sizes are for straight-side rims.

Solid Tire Sizes

With the advent of trailers and semi-trailers as an important factor in the automotive industry, there is also a demand for adequate tire standards for this type of vehicle. The Tire and Rim Division is of the opinion that it is unnecessary to have a separate standard for trailer tires as the present standard for pneumatic tires is considered adequate, but it is considered desirable and the division therefore recommends that the following solid tire sizes be included in the present S. A. E. Standard for Solid Tire Sizes, page 8bb, S. A. E. Handbook, Volume I.

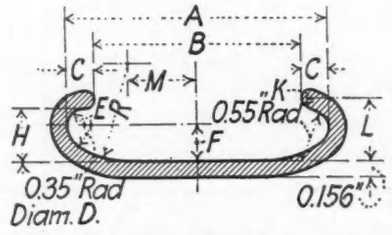
SOLID TIRE SIZES

In.	Mm.
36x3	75/762
34x6	150/711
34x7	175/711

Rim Sections and Contours for Pneumatic Tires

The present S. A. E. Standard, pages 8ha and 8hb, S. A. E. Handbook, Vol. I, does not include a 5-in. rim section. This was considered by members of the Tire and Rim Division, and it was the consensus of opinion that the rim section, which is to be worked out by the Tire and Rim Association, be adopted as S. A. E. Standard and inserted in the present standard.

In the cut for the clincher rim section, page 8ha, S. A. E. Handbook, Vol. I, the 0.55-in. radius is indicated as being to the outside of the rim, whereas it should be to the inside of the rim. It is therefore recommended by the Division that the present S. A. E. Standard for Rim Sections and Contours for Pneumatic Tires be corrected to show 0.55 in. as the radius to the inside of the rim.



Solid Tire Sections

It is recommended by the Tire and Rim Division that the present S. A. E. Standard for Solid Tire Sections be completed by inserting the area of 5 sq. in, for the 3-in. tire size. A canvass of the entire industry indicated almost unanimous approval of this area for the 3-in. size. Since the sectional rubber area should be expressed either with an allowable tolerance or as a minimum it is the consensus of opinion that the column in the printed standard should have the heading, "Minimum Total Sectional Area of Rubber, Sq. In."

Bolt Equipment for Solid-Tire Side Flanges

The Tire and Rim Division recommends that the present S. A. E. Standard for Bolt Equipment for Solid Tire Side Flanges, page 8xb, S. A. E. Handbook, Vol. I, be revised to include the 32, 34, 36 and 40-in. tire sizes only, thus eliminating the non-standard 30, 38 and 42-in. tire sizes.

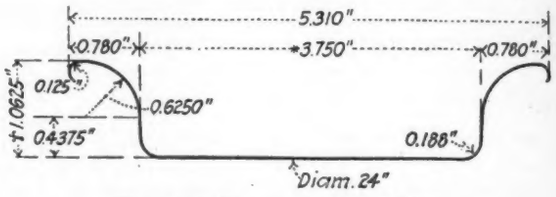
Wood Spoke Dimensions for Commercial Vehicle Wheels

The Tire and Rim Division recommends that dimension D in the illustration for wood-spoke dimensions for commercial vehicle wheels, page 8-0, S. A. E. Handbook, Vol I, and letter D in the heading for the column for the nominal spoke size be omitted. The dimensions for D (unfinished thickness of spoke between flanges) are not of interest to the engineer.

Four-Wheel Trailer Hitches

The Truck Standard Division recommends for adoption as S A. E. Recommended Practice the following proposal for Trailer Hitches.

As the U. S. Government pintle hook was used to a large extent the report was revised to permit its use.



Five-Inch Pneumatic Tire Section

It is not considered desirable to give a fixed dimension from the axis of the drawbar head to the ground because present truck frame heights are approximately the same within required limits. Lost motion between the eye and the drawbar head should be kept as small as possible to prevent the swaying of trailers in operation.

A spring, mounted preferably in the drawbar head, shall be used in the trailer hitch and may be either exposed or inclosed, as desired by the manufacturer.

Provision shall be made for chains or other safety devices in addition to the coupling link. A ⅝-in. chain eye clevis with a ¾-in. bolt shall be provided for attaching a safety chain, the clevis to be located directly under the axis of the drawbar head or as near to this position as possible. (If placed above the axis it is likely to interfere with operation of the drawbar head.)

The axis of the drawbar head shall be located, both vertically and horizontally, approximately in the center of the frame of the chassis.

The eye for the coupling link shall have an inside diameter of 3 in and an outside diameter of 6¼ in.

The eye shall be made of material 1⅝ in diameter formed as a torus. The drawbar head hook shall be made so as to take the recommended size of eye.

The coupling link shall carry the eye, but when no coupling link is used the eye shall be mounted on the trailer head. The eye shall be free to rotate so that it can be placed in either a horizontal or vertical position. When the drawbar head can be rotated the eye on the coupling link or trailer head shall be locked so as to prevent it from rotating.

Firestone Reliners

FIRESTONE Reliners give miles more wear to old tires. Built like the fabric in tires—carefully constructed to give better-than-average service, covering the weak spots, presenting an unbroken surface to the inner tube. Made full width, extending from bead to bead, thus protecting the sides as well as the tread.

Material is very fine Firestone Fabric, thoroughly saturated with the best grade rubber and molded to fit closely to the interior of the casing. Note the four layer taper ends.

Both ends are protected by a molded-in real rubber tip, originated by Firestone, which does not allow the tube to come in contact with the raw, rough edges of the fabric.

Firestone Tire Accessories are convenient helps to most miles per dollar tire service. They build your business by pleasing your customers. Order direct or through your jobber today.

FIRESTONE TIRE & RUBBER CO.
Firestone Park Akron, Ohio
Branches and Dealers Everywhere

Metal and Rubber Markets

Demands for Finished Steel Far in Excess of Supply

The steel producing industry has made progress during the past month and in spite of car shortage, inefficient labor, etc., it is fairly close to normal in some branches. But the supply is far short of the demand and shows little indications of equaling the demand for a long time to come. The shortage is acute. There is a great scarcity of bars which necessitates the mills running at about 75 to 80 per cent. capacity. However, this scarcity is due to lack of transportation facilities rather than supply for the output has increased far above normal. It is hoped that this difficulty will soon be overcome and that there will be a corresponding increase in sheets.

Steel Products Prices

Per ton, Pittsburgh—	
Bessemer billets	$48 00 a ....
Open hearth	48 00 a ....
Forging billets	64 00 a66 00
Sheet bars	50 00 a55 00

Sheets

The following prices are for 100-bundle lots and over f.o.b. mill:

Blue Annealed Sheets—	
Pittsburgh (base)	$3 55 a 4 50
Philadelphia	3 80 a 4 55
Chicago	3 82 a ....
Galvanized Sheets of Black Sheet Gauge—	
Pittsburgh	$5 70 a 7 00
Chicago	5 97 a ....
Tin—Mill Black Plate—	
Pittsburgh	$4 60 a 5 50

Tin Plate

Tin plate, per base box	$7 00 a ....
Terne plate, I. C.	7 05 a ....

Iron and Steel at Pittsburgh

Bessemer iron	$40 40 a ....
Bessemer steel, f.o.b. Pitts	48 00 a ....
Skelp, grooved, steel	2 45 a ....
Skelp, sheared, steel	2 65 a ....
Ferromanganese (80%)	140 00 a150 00
Steel, melting scrap	25 00 a25 50
Steel bars	2 75 a 3 00

COPPER.—During the past month there has been an occasional flurry in the market due to the fact that some holders have been anxious to unload before the end of January after which time deliveries must be specified. On the whole the market has continued steady and at current quotations of 19¼c for first and 19½c for second quarter.

ALUMINUM.—The market continues to remain unchanged with the same prices quoted as were stated last month. Virgin metal in ingots 98 to 99 per cent. may be had at from $32 to $33.

TUNGSTEN.—The undertone of the market is easy with steady prices. Chinese Wolframite is offered at $7, Bolivian from $9 to $9.50, and American Scheelite at $15 per unit.

Other Metal Products

The following prices are current for brass and brone products.

Copper sheets, not rolled	$29 50 a ....
Copper bottoms	38 00 a ....
Seamless tubing, bronze	34 50 a ....
Cut lead sheets	11 75 a ....
Copper rods	26 75 a27 50
Copper wire	22 25 a ....
High brass wire	25 25 a ....
High brass sheets	25 25 a ....
High brass rods	23 75 a ....
Low brass sheets	27 25 a ....
Low brass wire	27 25 a ....
Low brass rods	28 00 a ....
Brazed tubing, brass	37 00 a ....
Brazed tubing, bronze	41 75 a ....
Brazed tubing, copper	41 75 a ....
Seamless high brass tubing	30 50 a ....
Seamless low brass tubing	33 00 a ....

Old Metals

Aluminum scrap is in demand but can be had only in small lots. Copper is quiet and steady. Prices quoted on January 27 follow:

	Buying.	Selling.
Aluminum—		
Cast scrap	23½a24½	26¾a27
Sheet scrap	23 a23¾	25½a26
Clippings	26¼a27½	29½a30
Copper—		
Heavy machinery comp.	15¼a15½	17¼a17¾
Heavy and wire	14 a14¼	16¼a16¾
Light and bottoms	12¾a13	14¼a14¾
Heavy, cut and crucible	16 a16¼	18 a18¼
Brass, heavy	7¾a 8½	9½a10
Brass, casting	10¾a11	11½a12½
Brass, light	6½a 6⅝	8 a 9
No. 1 clean brass turnings	8⅜a 8⅝	9¼a10¾
No. 1 comp turnings	12 a12¼	14¼a14½
Tea lead	4⅞a 5	5¼a 5½
Lead, heavy	6¾a 7	7¾a 8
Zinc, scrap	4¼a 4½	5 a 5½
Solder joints	10 a10½	11½a12½
New zinc clippings	5¼a 5½	6 a 6½

Rubber Market Steady

A keen speculative interest is rife in the plantation market but sellers are prone to shade their prices, thus preventing a large amount of business which might otherwise be transacted . The few owners who are willing to sell will not drop the slightest degree from their quoted prices. Prices quoted January 27 were:

Up-river, coarse	34½a ..
Island, fine	45½a ..
Island, coarse	21 a ..
Caucho, ball, upper	34 a ..
Caucho, ball, lower	31 a ..
Cameta	23½a ..
Plantation—First latex crepe	52¼a ..
Brown crepe, thin, clean	45 a 46
Rolled brown, crepe	42 a 43
Smoked ribbed sheets	52¼a ..
Centrals—Corinao	34 a ..
Esmeralda	34 a ..
Guayule, wet	25 a 27
Guayule, washed and dried	.. a ..
Balata, block, Ciudad	70 a 73
Balata, block, Colombian	48 a 52
Balata, black, Panama	46 a ..
Balata, sheet	*1 00 a ..
Mexican—Scrap	30 a ..
Slab	.. a ..

* Nominal.

SCRAP RUBBER.—The market remains dull, with prices unchanged but nominal.

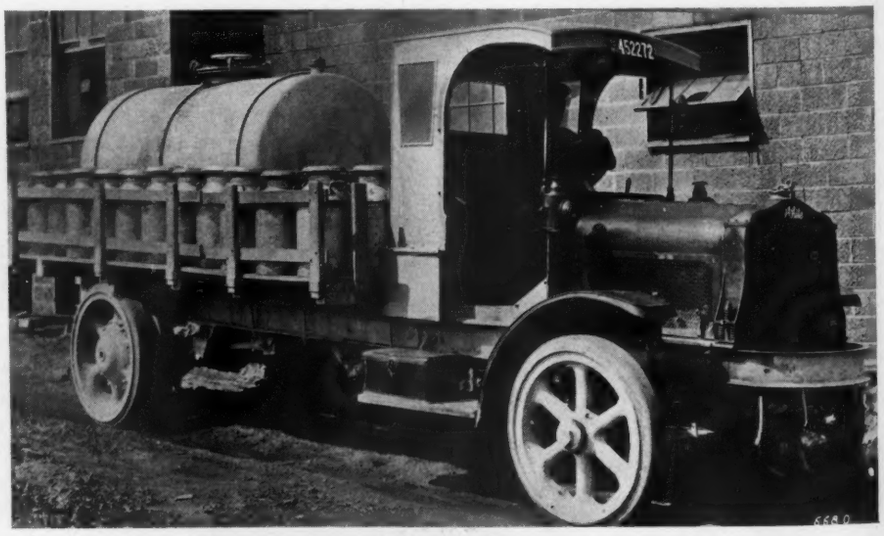
Boots and shoes	8¼a ..
Arctics, trimmed	6 a ..
Arctics, untrimmed	5 a ..
Tires—Automobile	3¼a ..
Bicycles, pneumatic	2½a ..
Hose, steam, fire	1 a 1¾
Inner tubes, No. 1	.. a 17
Inner tubes, No. 2	.. a 9

Pennsylvania Rubber Elects Officers

JEANETTE, Pa., Feb. 10.—The following officers have been chosen for the ensuing year by the directors of the Pennsylvania Rubber Company: Herbert DuPuy, chairman of the board; H. Wilfred DuPuy, president; Chas M. DuPuy, vice-president; Seneca G. Lewis, vice-president and general manager; A. H. Price, treasurer; Geo. W. Shiveley, secretary; James Q. Goudie, general sales director; and H. H. Salmon, purchasing agent.

Truck Big Factor in Live-Stock Trade

The rank of this city as a livestock center has been increased by extensive truck livestock shipments from the neighboring agricultural districts, particularly in hogs. Of 3,584,000 head of stock handled through local stock yards last year 2,940,000 were hogs, valued at $29,375,000. More than 1000 trucks are in service in hauling livestock to this market.



Rapid, Sanitary, Cool and Economical Method of Transporting Milk

The Reick-McJunkin Co., Pittsburgh, Pa., being confronted with an unusually acute problem, due to the lack of pasturage in the valleys adjacent to the city, evolved this novel and effective means of collecting and distributing milk. This truck consists of a glass-lined steel tank of nine hundred gallon capacity, mounted on a five-ton White chassis. A rack built around the tank permits the carrying of additional milk in cans. This glass tank is in reality a giant thermos bottle and not only keeps the milk clean but also affords a rapid and clean means of loading and unloading.

ROSS STEERING GEARS

Contented Drivers Mean Greater Efficiency from Man and Motor Truck

About 85 per cent. of the actual operation cost of a motor truck is represented by the salary of the man who drives it. This is a fact which must be considered both by the manufacturer or dealer who sells the truck and by the man who buys it.

All the time that the truck is running, the steering gear must be operated by the hands and the arms of the driver. Easy steering conserves human strength, makes a more contented driver, and means a bigger day's work more easily done.

Because their enormous bearing surfaces guarantee easy steering, safety and reliability, and thus increase efficiency, 165 motor truck manufacturers are now using Ross Steering Gears as standard equipment.

Write for further information

ROSS GEAR & TOOL COMPANY
760 HEATH STREET, LAFAYETTE, INDIANA, U. S. A.

The Steering Gears that Predominate on Motor Trucks

Indianapolis Firm Inaugurates Motor Truck School

Serviceability of Truck is Largely Dependent Upon the Mechanical Knowledge of Drivers

A SCHOOL for the motor truck owner as well as the driver of that truck is the plan of the Fisher Automobile Company, of Indianapolis, distributor of Packard and Reo equipment, to increase the efficiency of the motor truck.

The owners are not taking to the school with the avidity of the drivers, for the owners have other interests, yet a few of them have been so interested in keeping their motor truck equipment in the best shape and getting the best service from it that they have enrolled in the Fisher motor truck school.

But the drivers have responded to this instruction, responded like born students and men interested in improving themselves in their chosen profession.

The knowledge obtained after years of observation of motor truck performance induced the Fisher Automobile Company to establish the school. The years taught the executives of the Fisher Automobile Company that men who cared nothing about the trucks because of their ignorance of the mechanics of a truck determined in a great way the efficiency of the trucks and what owners got from the trucks; in short, about how good an investment the motor trucks were to the owner.

Conscientious Men Required

Experimenting in the best ways to sell trucks, and to put over the idea of motor truck transportation, the Fisher Company decided that if the trucks were to run as they were designed to run and would run if given half the chance, the type of driver would have to be raised. Not anybody could drive a motor truck. The driver had to be a man of sense, a man who could see the business point of view of his employer, and who saw in the driving of the truck a way of making a living, a chance to improve in expertness, and the opportunity to get a larger wage as he developed in expert knowledge of the motor truck.

The Fisher Company, according to Ellis Hunter, secretary, saw that business men were buying motor trucks costing $3000 and more and turning them over to low-grade drivers, who cared nothing for the motor trucks, or of the various employers' businesses generally. The motor truck drivers generally were not paid high wages—not what they should have been paid, to obtain the higher grade labor.

The result of the bad man on the driving job was bad care of the motor truck and lack of proper administration in its use. Therefore, the motor truck did not show the earning capacity it should have shown.

Any good motor truck is apt to get off badly if any man but the right man or the best educated man is on the job as driver. This, Mr. Hunter rightfully maintains, greatly endangers future sales of that particular truck; in fact, every other truck.

Owners Induced to Participate

The motor truck school of the Fisher Automobile Company has become popular among the Indianapolis truck drivers. A few owners attend the school, but the majority of the students are employees, anxious to learn all about the truck they drive and all other trucks. They recognize, according to Mr. Hunter, that their future wage scale will be determined by how efficiently they drive their truck.

The motor truck owner should not imagine that motor truck drivers are plentiful. They are indeed scarce. That's why the training of them is essential and beneficial.

F. H. Misner
Head of the Fisher Motor Truck School, Indianapolis, Indiana

But recognizing the fact that the development of better drivers would be of merchandising benefit, the Fisher Company instituted the school, put a motor truck expert, F. J. Misner, at its head, who, in addition to the prescribed course, taught them motor truck transportation. At the finish of the school a certificate of attendance was given each of these drivers, and among the drivers it is no secret that a higher wage goes to the graduates of this school.

Proper care keeps the motor truck in service. Indifference and careless attention puts it in the repair shop. Therefore, the profitable motor truck is the one kept in service all the time by a conscientious, educated driver.

The Fisher school for truck drivers and owners consists of ten lessons, one session following the other. The school has become so popular that it is always going, one group starting after the other has finished. From the graduates of this school a motor truck drivers' club has been formed—not a union, or anything approaching a union—but a club of men interested in further study of the motor truck and in further increasing their own efficiency in the world of transportation.

The curriculum is interesting. There are ten lessons, as follows:

1. Lubrication—motor parts.
2. Lubrication continued—carbon.
3. Carburetion—Ignition—valve action.
4. Frame — springs — axles — steering gear.
5. Clutch—transmission—differential—brakes—universal joints.
6. Lubrication—chassis.
7. Cause of motor troubles—remedies.
8. Résumé of lubrication—inspection.
9. Operation—road demonstration.
10. General discussion — social sessions.

Specialists Assist

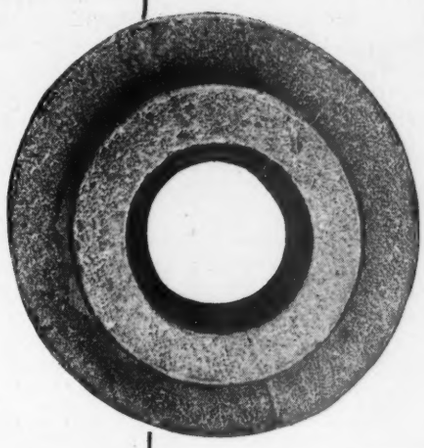
Mr. Misner does not attempt to do all the teaching himself. For instance, he has oil specialists come to the school and talk about the properties of oils. An attorney might drop in for an hour's lecture and talk about the responsibility of the motor truck driver in cases of accidents and the responsibility of the owner, what courts have decided in regard to the motor truck, and what big questions have not been adjudicated, its definite place legally as a common For the motor truck has not as yet taken carrier.

In Indiana, for instance, the Indiana Public Utilities Commission is contemplating classifying the motor truck somewhere along with railroads and interurbans, but the job seems too severe for even the experts on the commission.

What does the business man get out of these schools? Mr. Hunter says business men, owners of motor trucks, get more from them than the drivers. Motor truck transportation has become one of the departments of the usual business house and it must be considered as a department of that business—one making money, and if so, to be encouraged, or one losing money, and, if so, determining the ways to stop the leaks.

Certainly, the business man should know some of the things the driver is up against. He ought to know with his driver about motor truck costs, or else he may be maintaining a motor truck white elephant in his establishment.

SIVYER CASTINGS



Sivyer Steel hubs used on Jaxon full floating truck wheels

The Sivyer Service of providing Electric Steel Castings has for its objects the decrease of machining costs and the increase of wearing quality and life. Both are attained by methods which result from long experience and begin with the design of the casting itself. When we find that a casting we are asked to furnish is of a design not consistent with good foundry practice, we study its function in the completed unit and offer the necessary suggestions to make it a really practicable casting job without affecting in any way its function and efficiency.

Secondly: Sivyer Service analyzes the functions of the casting and specifies the proper composition steel for the job; long experience with carbon and alloy steels has enabled us to reduce costs and increase quality remarkably for many different industries.

Thirdly: Sivyer Service makes a careful study of the pattern and molding problems involved, for improper gating and insufficient risers are often the greatest wasters of machining labor and metal.

Fourthly: Sivyer Service analyzes carefully the proper annealing methods to be used and controls their proper application through unfailingly efficient equipment and men. In short, the Sivyer Service supervises every step necessary to secure unusually and unfailingly good castings of electric steel. It never relies on one factor alone, relies very little even on the natural freedom of electric steel from occluded gases and on its commonly recognized merit in resisting crystallization. It also depends but little on the inherent scientific accuracy of the electric furnace process. From casting-design to sand-blasting and tumbling, the fundamental superiority of Sivyer Steel is due to its men and metal. Their value is best proved by the fact that, although the production of steel castings is generally looked upon as a local one, the Sivyer market is national.

TO obtain greater strength and durability in automotive construction, many manufacturers now use Sivyer Electric Steel in places where malleable iron was once thought good enough. The makers of the Jaxon resilient truck wheel decided to have the hubs of their heavy duty wheels made of Sivyer Electric Steel because of its superior toughness and notable resistance to crystallization and wear—because Sivyer molding methods yield steel castings unique in their freedom from shrink holes and strains, and because a special molding sand mixture, careful sand-blasting, tumbling and annealing made these parts uniformly smooth and easily machineable. It is qualities such as these, bettering the product while cutting the finishing costs to the core, that have won for Sivyer Castings their country-wide market.

SIVYER STEEL

SIVYER STEEL CASTING COMPANY, MILWAUKEE

The business man, or the owner, is interested in increasing efficiency in his men. For instance, one employer attending the Fisher school—one of those fellows who prided themselves on getting young blood, decided that the older man, the man of middle age, the man of family responsibilities, was in the long run the better man for the driver of his motor truck. And even though this man were lacking in the little mechanical knowledge, which in itself is a dangerous thing, he is dependable and reliable.

Here's the example of one employer who has been in the school, and is now a post-graduate—William H. Thornhill, who was the owner of a two-ton chain drive Reo, which had given long service, probably through the good care which it received. Mr. Thornhill, believing in taking proper care of his truck, had insisted that his drivers should never go more than ten miles an hour. He had a speedometer installed on the truck. Time and a half was paid for overtime to discourage the men hurrying home after the day's work. He discarded partly worn chains and sprockets to avoid possible interruption of service.

Every Monday morning the necessary time was taken to oil the truck. Every alternate Saturday the oil was dumped out of the crankcase and clean, fresh oil substituted.

He later traded the Reo in on a Packard—a larger truck. Instead of the average price of $500 for that Reo, he obtained $850, making a net gain of $350 in resale value, to say nothing of the freedom from interruption of service, freedom from repairs and costs.

Bad drivers, according to Mr. Hunter, are a bad investment. One firm near Indianapolis bought a truck to haul logs. Their drivers had to be away several days at time. After one year the thirteenth driver is working on that truck. When competent drivers were found they were unreliable in other ways. One, provided with expense money, forged receipts and kept the money. Another went in the trucking business for himself on the out drives, pocketing the money himself and taking the employer's time in getting the loads. Another tinkered everything out of adjustment. The thirteenth is a man of middle age, one past the impetuosity of youth.

The Fisher school is proving that owner and driver need education on the right and the wrong way to use a motor truck; that it must be cared for rightly if it is to be preserved and if the right profits are to be obtained.

The motor truck is part of the business and the driver is a man whose value increases as his efficiency increases.

The Great British Railway Strike

The Commercial Car Universally Recognized as the National Safeguard

THE railway strike in Great Britain constitutes a landmark in the history of commercial car development in that country and very probably throughout the world, for it has emphasized as nothing else could have done, the value of an organized system of motor transport, as a national asset and safeguard in case of emergency. From the civilian point of view, the war has shown the capabilities of the motor truck; the strike has shown the necessity of it. It is no exaggeration to say that the commercial car has saved the country again, and this is openly admitted on all sides.

Motorists Volunteered Aid

But the organization which made this possible was no mushroom growth born of sudden emergency, but the result of shrewd foresight. Ever since February the Government could see the trouble coming, and months before the war, engineers and motorists were asked whether in case of national emergency they would volunteer for carrying on the transport of the country. Needless to say, this enquiry met a generous response, but when the strike was actually launched upon the country at a few hours' notice, more volunteers were called for, and the public appeal brought in another 250,000 offers. As a matter of fact, the answer was such that actually by the time the strike ended, only about one-tenth of the volunteers had to be called up.

Naturally the transport organization that had been built up for war purposes came in most useful, in fact, without it, it is very doubtful whether the automobile trucks could have been organized in time.

The first step was to ensure a supply of vehicles and the gigantic army repair depot at Slough was kept busy turning out hundreds, while other hundreds of the British army trucks were rapidly brought across from France. In addition, many of the leading firms owning considerable fleets of cars handed them over to the Government, lock, stock and barrel, placing the services of their drivers at the Government's disposal. Finally, an order was issued, under which the Government was empowered to commandeer any vehicle they required, though at first this power was but little exercised. It was only as the strike went on that commandeering assumed any considerable dimensions.

Hyde Park was promptly closed and turned into a milk depot, which was at once supplied by six convoys, each of which was assigned its own district, and composed of forty to fifty ¾-ton trucks. These collected milk and distributed the empty cans within a radius of 115 miles, and so effective was the service that despite its gigantic demands, London never had less than half its usual supply. In two or three days' time things began to improve, and the capital again found itself with its normal supply. Before the end of the strike over 1000 big trucks were engaged in milk transport alone.

Trucks Transported 12,000 Tons a Day

I have taken the milk trade as an example, because it was rightly regarded as the key of the position. Stocks of meat, flour and other essential provisions were in most places ample, although the requirements of London alone amount to 12,000 tons a day.

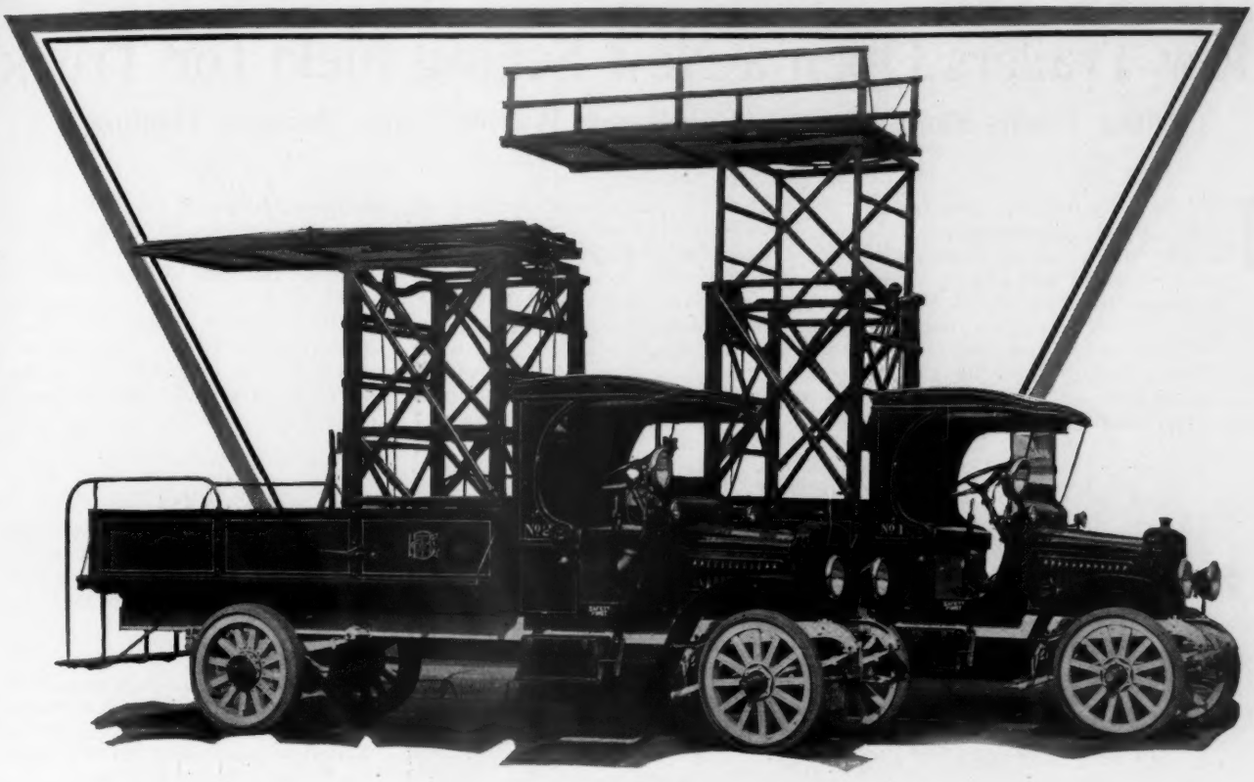
Throughout the country some 5000 big trucks were engaged in the transport of essential foods. For this purpose the country was once again, as in war, divided into twelve areas, each under a Food Controller, who was responsible for the supplies in his own district. This was only a resuscitation of the war-time organization of the Road Transport Board.

A good many of the markets, for example, that for fruit and vegetables at Covent Garden, and for meat at Smithfield, were kept going mainly by private transport, though, if the transport workers as well as the railway men had come out on strike all this and much other automobile transport would almost certainly have been commandeered and worked under Government instructions.

Traffic Heavy, But Not Congested

Naturally with hundreds of trucks doing long distance traffic normally taken by the railways, some of the main thoroughfares became congested, but it was quickly demonstrated that, even where the volume was heaviest, traffic could be passed along highways at speed. Just before the strike, the writer happened to have been responsible for a count of the number of vehicles along a main thoroughfare leading from the manufacturing centres of the north and midlands to London. The figures then passing within nine hours amounted to 4736 automobiles and 2226 horse-drawn vehicles. During the strike, a fortnight later under almost exactly similar conditions, the automobiles passing during the nine hours numbered 6837, the horse conveyances 2339, which shows fairly conclusively the part taken by the automobile in meeting the crisis. Of the automobiles, the 'buses increased from 1922 before the strike to 2135, private cars from 971 to 1471, motor cabs from 1716 to 2967, and vans and trucks from 1098 to 1735.

These figures about reflect the conditions throughout the country. Within a few days the automobile traffic was increased by some 50 per cent. to meet the emergency, which the British public really met magnificently.



The Atterbury in the Street-Car Business

"We have had in use ATTERBURY TRUCKS for emergency line work, tower construction work and general carting, since 1912, and these trucks have given very satisfactory service. We believe that they will stand the test equally as well as any truck known to us on the market."

INTERNATIONAL RAILWAY CO.

10 years of truck making experience behind each ATTERBURY

You may be able to get an Atterbury Dealership if you write or wire now

ATTERBURY Dealers are proud of the way Atterbury Trucks make good in every line of business.

Especially does the Atterbury shine where conditions are the hardest—and work the most continuous.

The street-car business is just one good example.

ATTERBURY MOTOR CAR COMPANY, BUFFALO, N. Y.

ATTERBURY

MOTOR TRUCKS OF MAXIMUM SERVICE

How Trailers Open a New Selling Field for Trucks

Make Trucks More Economical by Saving Waiting Time. Increase Hauling Capacity of Light Trucks

HAULAGE by highway presents a great many complications and problems, as every successful truck salesman well knows. True salesmanship calls for a broad knowledge of these problems and of highway transportation and traffic conditions. The salesman who talks and sells transportation will make a bigger and more permanent success than the one who cannot see further than the mere sale of the particular truck he represents.

In selling transportation it is essential to know the advantages and limitations of each method and to have the moral courage to advise customers honestly in all matters relating to their particular problems. The truck dealer should be willing even to tell a prospect that he can do his work cheaper with horses or with an industrial railway than with motor trucks if a study of conditions shows that to be the case. It will pay in the long run, although it may result in the loss of an immediate sale, because confidence and good will will be established and the man will be glad to tell his business acquaintances that they can depend on absolutely honest treatment from the dealer.

The truck dealer or salesman cannot have a thorough knowledge of highway transportation unless he knows considerable about the possibilities of the use and economy of trailers. Many dealers are not interested in trailers because they labor under the belief that the sale of a trailer will spoil the sale of a truck, which will mean a smaller commission or profit. This is not only a narrow view to take, but, broadly, it is a false idea. The fact is that the public is bound to find out the best and most economical means of haulage, and if the truck dealer will not supply it, someone else will do so.

Truck Makers Recommend Use of Trailers

Leading truck manufacturers who have looked into the matter know that there are a great many cases where trailers and semi-trailers can be used by truck owners to great advantage, and the manufacturers build road tractors for hauling semi-trailers or recommend the use of four-wheel trailers with their regular trucks under favorable conditions.

Very often, by showing a prospect what can be done in his business with a trailer or semi-trailers, the dealer or salesman can effect a double sale of a tractor and semi-trailer where it would be impossible to sell a motor truck alone. Or he can sell one or more four-wheel trailers or a pole trailer when the customer would not consider buying an additional truck.

A truck owner's haulage requirements may fluctuate considerably, but not enough to warrant buying another truck. So he is prone to overload the one he has and have trouble with it. A trailer would take care of the occasional overload at very small expense. Intercity and rural motor express companies will become large users of trailers because their business is much heavier at some seasons or periods than at others and it would not pay them to buy enough additional trucks to handle the peak business only to let them stand idle at other times. By using trailers they will get and hold this extra business and grow to the point where more trucks will be needed.

Keep Trucks Busy on the Road

In many trades the efficiency and economy of the motor trucks are greatly diminished because of the time lost in loading and unloading, as in the lumber business, for example. It is often impossible to show that the use of motor trucks would be more economical than the use of horses in such cases. But when it is shown that by the use of trailers or semi-trailers a truck or tractor can be kept on the road practically all the time, one trailer being left for loading while another is in transit, the customer will readily see that an important saving can be effected and a sale may be made of a truck and two trailers. Thus the trailers really sell the truck.

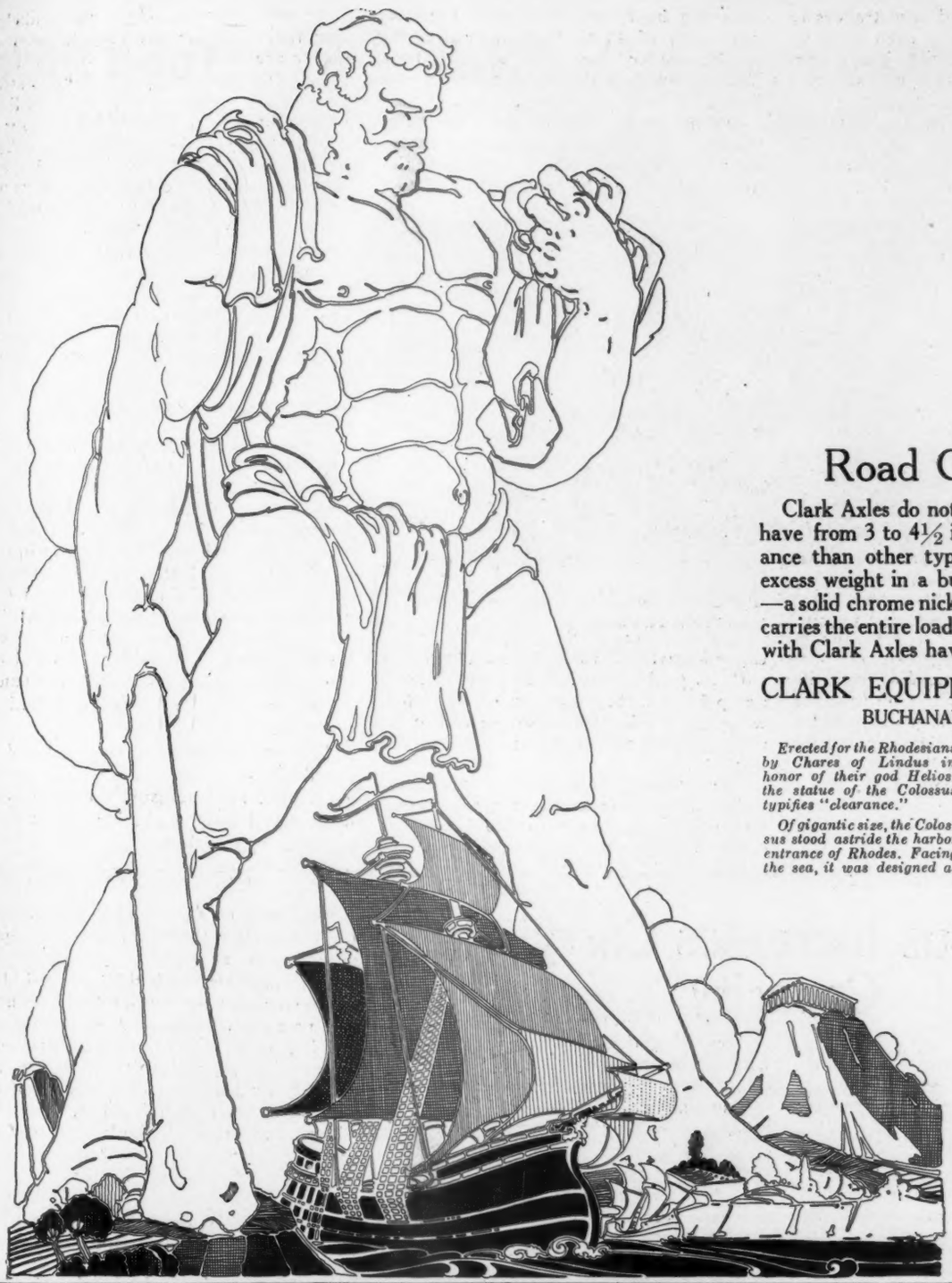
Haulage contractors are often called upon to move boilers, tanks, derricks, long timbers, structural steel and other objects too bulky, too heavy or too long to be loaded on a motor truck. Heretofore such articles have been hauled with horses—sometimes with six to ten teams, and at great expense and trouble. The only way trucks can be sold for such work is in combination with trailers, and when it is shown how easily, quickly and cheaply trailers can do the jobs the trailers sell the trucks.

Broaden the Dealers' Selling Field

A dealer who handles trucks of only one or two tons capacity finds the market for larger trucks closed to him and misses many sales of larger sizes. If he

Left: Showing a Five-Ton Troy Tractor Coupled to a Five and a Half Ton Mack Truck. Combinations Such as These Afford Economy in Transportation.

Below: View Showing a Watson Tractor and Pole Trailer Hauling Twelve Tons of Poles. The Unwieldly Bulk of Materials Sometimes Hauled Make the Use of a Trailer Imperative.



James Cady Ewell

Road Clearance

Clark Axles do not "drag their feet," they have from 3 to 4½ inches *more* road clearance than other type axles—they carry no excess weight in a bulky differential housing—a solid chrome nickel steel one-piece forging carries the entire load. Motor trucks equipped with Clark Axles have ample road clearance.

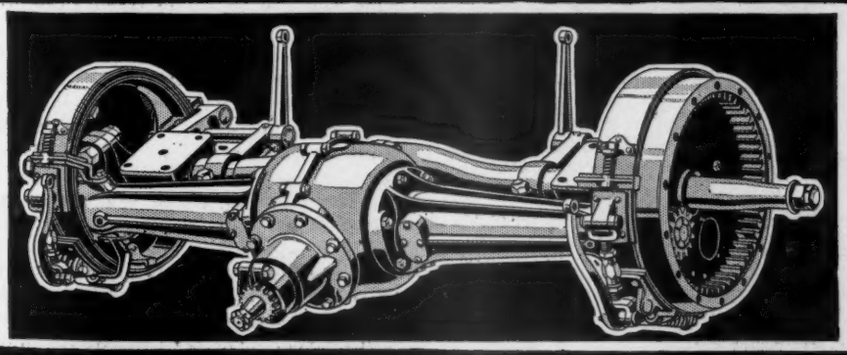
CLARK EQUIPMENT COMPANY

BUCHANAN, MICHIGAN

Erected for the Rhodesians by Chares of Lindus in honor of their god Helios, the statue of the Colossus typifies "clearance."

Of gigantic size, the Colossus stood astride the harbor entrance of Rhodes. Facing the sea, it was designed as a harbor guard. All shipping passed beneath it.

Just as the Colossus cleared the ships of that long past age, motor trucks equipped with Clark Axles have a safe margin of clearance on all roads.



Exhibiting at Boston Motor Truck Show March 13 to 20, 1920

CLARK
Rear Axles-Steel Wheels-Locking Differentials For Motor Trucks
EQUIPMENT

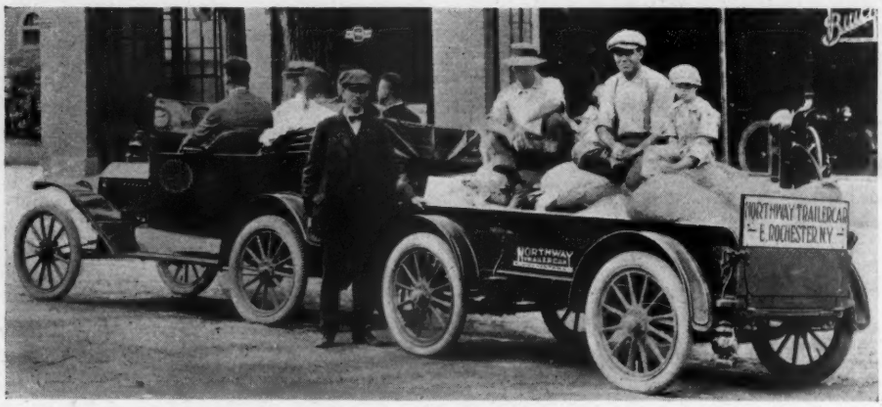
Clark Steel Disc Wheels make good motor trucks better—for solid or pneumatic tires

CLARK INTERNAL GEAR DRIVE MOTOR-TRUCK AXLES

had a line of trailers and semi-trailers to offer he could close many such sales by showing how, with a semi-trailer, a one-ton truck can be converted into a three-ton unit or a two-ton machine into a five-ton vehicle, or how, with a pole trailer or a four-wheel trailer, the carrying capacity can be doubled and the ton-mile cost of haulage cut almost in half.

tons can be hauled over poor roads or pay loads of 12 to 15 tons transported legally under the various state laws, thereby enabling the operator to get the benefit of reduced ton-mile cost.

On the other hand, if the dealer represents only a line of heavy trucks, he can show the owner of a five-ton machine how a trailer can be used with it to take



One-Ton Four-Wheel "Hi-Speed" Trailer, Pneumatic Equipped, Used With Light Passenger Cars for Miscellaneous Hauling

In many sections the roads are not suitable for the use of trucks of five tons capacity or more. This is true in most farming sections. Consequently, sales are restricted to the smaller sizes. And in many states the laws limit the gross weight of vehicle and load to 10, 12 or 14 tons. When semi-trailers or trailers are used, the weight is distributed over six or eight wheels, so that four or five

care of small additional loads. The trailer with its load can be left at an intermediate point on the route to be unloaded, while the truck goes on to the end of its route, picking up the trailer on the return trip.

The demand for trailers is increasing and it is not uncommon for a prospective trailer purchaser to inquire for a make of truck that can be used successfully with trailers. He is most likely to buy that make whose manufacturer and dealer are willing to give assurance that it has power enough and is built strong enough to pull a trailer over ordinary roads and grades without injury to itself. The fact that the dealer in any make of truck also handles trailers will be sufficient assurance to most purchasers that he does not hesitate to recommend his trucks for use with trailers.

Once sold, trailers are no further bother to the dealer. There is no service to be rendered, no free adjustments to make, etc. Some instruction should be given in how to operate a truck with trailer, but aside from that the dealer is under no expense for trailer service.

Truck and Trailer Dealers

Truck and automobile dealers are the logical persons to handle trailers in all places except the larger cities, where exclusive trailer distributors or dealers may be appointed. They have a clientele of owners, know the business houses in their communities and their haulage requirements and should find the selling of trailers a comparatively easy matter. The taking on of a line of trailers will give them a good opportunity of reopening the whole subject of motor equipment, with a possibility of selling additional trucks as well as trailers.

The use of trailers is so varied and the possibilities of saving in hauling cost so great that an interested audience is almost certain to be obtained from every prospect approached.

New Bus Increases Carrying Capacity

A NEW omnibus with a covered upper deck practically inclosed in glass of increased carrying capacity has recently made its appearance in Chicago. This new bus not only protects passengers on the top, but more than doubles the seating capacity of those previously operated in Chicago, thereby greatly increasing the earnings during bad weather as well as increasing the comfort of passengers, without appreciable increase in operating or maintenance costs. This new vehicle is fundamentally similar to the older type. Instead of the twenty-five inclosed seats available on the old style bus in bad weather there are sixty in the new bus. The cost of operating the old fifty-one passenger bus averaged in December, 1917, 29 cents a mile.

New Inclosed Top on Chicago Bus not Only Protects Passengers But More Than Doubles Seating Capacity of Busses Previously Used.

Designers of the 60 passenger closed-top car declare that the increase in operating cost is negligible.

The designers based their general ideas of construction on the old bus. The fifty-one passenger buses had their test and proving by 3,500,000 miles of actual service in Chicago, and this experience was utilized to advantage by designers of the new bus. Its length is 25 ft. 6 in.; the width 7 ft. 6 in., while the height from the roadway when loaded is 13 ft. It has a wheelbase of 176 in., height of lower deck from roadway 12¾ in. Height of upper deck from roadway is 86 in. when loaded. Both decks are lighted by a generator driven by the engine and the heat is supplied by deodorized exhaust gases from the engine. The front tires are 6 in. single style and the rear ones are double with a total tread of 12 in. The power plant is the A M B C standard type of front-wheel drive made into a detachable unit with constant mesh transmission. The brakes on the rear wheels are placed so as to be supplied approximately to 500 sq. in. of braking surface.

However, the covered upper deck with its 41 windows is the principal feature. Of course, this is made possible by the front wheel propulsion and consequent low hanging body, enabling the cover to easily clear elevated structures under which it must pass. The Chicago company expects to install these vehicles as rapidly as they can be built.

Read how the manager of THE HOWARD REFRACTORIES COMPANY, Dorsey, Maryland, saved contracts by keeping his firm's busy trucks eternally on the job.

"BUT for 'NOBBY CORD' PNEUMATIC TIRES our trucks would have been useless last winter, as solid tire equipment invariably stuck in the mud before reaching our plant."

"Since July, 1918, 'NOBBIES' have served us under capacity loads of heavy fire brick and weighty materials and to date a slight nail puncture is the only sign of depreciation."

'NOBBY CORDS' mean—less operating expense—increased speed—reduction in mechanical repairs and vibrations—decrease in gasoline consumption—decrease in oil consumption—greater traction—elimination of breakages—less depreciation.

'Nobby Cords' Save in Every Phase of Truck Operation

Central Nevada Freighting Extensively Motorized

Economic Advantages of Trucks Have Forced Rapid Adoption. Pneumatic Tires Much in Favor. Need of Concrete Road and Grading Education

By FRANK REED

THE men who demonstrated and pioneered the selling of motor trucks in the arid, sandy, tortuous, in places precipitous, and in summer, almost tropically heated desert trails of Central Nevada, must have had a courage and persistency inherited from the trail makers of the hardy pioneers who traversed this menacing waste seventy years ago. The advance in motor truck haulage in the past eighteen months in this country that tests the endurance of motor, rear end, tires, and every spring and bearing to an extent that can be appreciated only by one who has actual experience in mountainous desert automobile travel, affords an astonishing testimonial to the strength and reliability of the modern truck.

Yes, even the cowpunchers recognize that the motor truck has won its way in Nevada. The tourist may honk till his horn bursts, and then take his own way through a bunch of shorthorns on the road. But the motor freighter receives special courtesies. If he is on a grade or in sand cattle are run off the road to let him pass.

The Eagle and the Tortoise

Late in October, while camped at a water hole some 6000 ft. above sea level on a road that winds up a mountain range that lies between the city of Elko and the valleys that run northward to the Idaho line, a roaring motor high above claimed attention in startling fashion. Looking over sagebrush and rocks, high above the skyline of the opposite snow-capped range, which lies southeast of Elko, the easily recognized song of a Liberty motor led the eyes to the astonishing sight of an airplane. It was flying toward its destined landing place at the Presidio, close by the Golden Gate, with a purposeful directness and confidence that made it a graceful and inspiring thing, almost seeming alive. In five minutes it had passed out of sight beyond the high rim of the summits. A cottontail scurried from his resting place under a sagebrush to the security of a rock pile. Quail coming down from the hills to drink at the rill that trickled over the brim of the spring, whistled and rustled in the chaparral. Otherwise there was no sign of life in the desert.

Suddenly a vibration was felt in the eardrums. Soon it developed into a definite sound, and was shortly explained by the appearance, far down the mountain side, of a dark spot, slowly creeping up the winding road. Then it took the form of a motor truck. As it came close, it showed its load, towering strikingly above the declivity at the right hand side of the narrow road, was household effects. A woman, and a flock of children, rode with the driver. As they stopped at the water hole, it was learned that a miner's family, with their furniture, were being moved to a camp some hundred miles north. Forty-eight hours from the time of starting they would be having flapjacks cooked in their own frying pan for breakfast in the new home. The driver, having come eight miles of continuous heavy grade, poured a little water in the radiator, threw in the clutch and sent his Mack forward on the yet stiffer four miles to the summit.

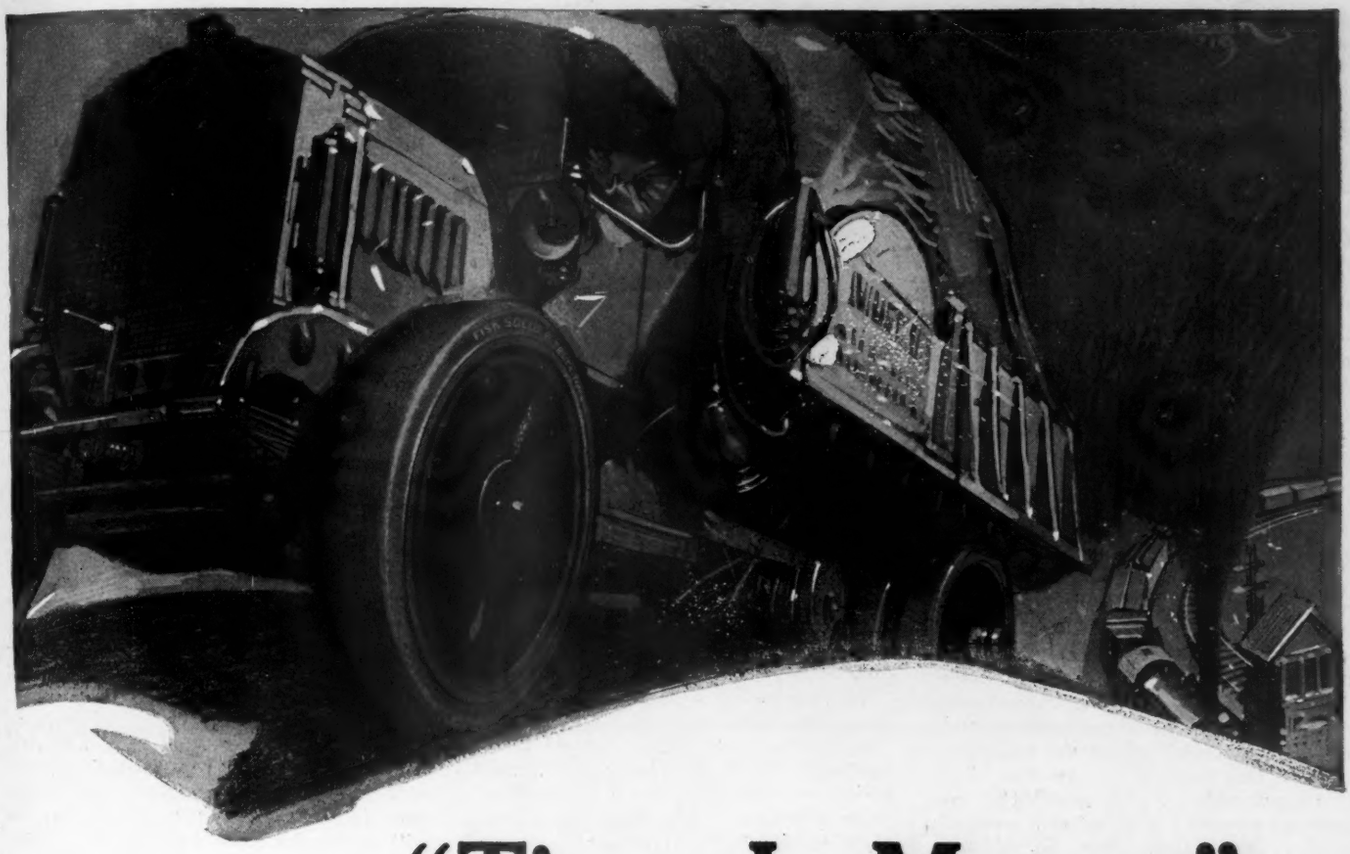
The next visitor was a young Italian, driving a ¾-ton Republic. It had been wished on him, he said, "after odder feller, he load 'em up, way high. Too much. She don't pull pretty good now." Still, with a capacity load, after cooling off and filling the radiator, he went on his way, and made the summit in a few minutes. He was "only going little way; to a ranch, thirty miles. Yes, it used to take man from ranch with a mule outfit two days each way, hauling supplies. Mebbe come in town, get drunk, be whole week. Now they telephone me, I start sunrise from town, get home again by noon. I take another load somewhere this afternoon. Hauling business pretty good business. I get me bigger truck pretty soon," he had stated.

Speed Wagons and Dare-Devil Drivers

"Hundred per cent. motorization" is something my enthusiasm keeps me looking for wherever I go. But who would dream that one of the most promising localities to look for it would be a road of astonishing difficulties, leading into a land where for miles on end there is no sign of human habitation, nor of water. Yet, for these very reasons, motor haulage, having proved itself, is rapidly displacing the string of pack burros of the prospector, and the twenty-mule and heavy wagon outfit of the freighter.

When the direction of travel gives these desert motorists a downhill pull, the stage drivers of the good old days would get their hair curled by a ride on one of the pneumatic tired outfits that are coming in. Did you ever read that comical piece old Artemas Ward wrote about the time he and Horace Greeley took a ride down the mountains with one of those hard boiled old time stage drivers? Well, go up to Tuscarora, and get aboard one of those pneumatic tired Reo speed wagons, and kind of insinuate to the driver that the other fellow you came up with is pretty good at making his bus perform. A baker in Elko, who goes up that road often to hunt, said, 'Gosh, you ought to see 'em skid them downhill curves. They come down from Tuscarora, fifty o' these here long mountain miles, and never get behind schedule. You'll see 'em coming down the

The Cow Trails of the Desert States Have Become Motor-Freighting Highways. Cattle Giving Right-of-Way to a Truck at the Ten-Mile Spring, on the Fourteen-Mile Pull Up the Mountain North of Elko, Nevada



"Time Is Money"

AN old saying, but, since the dealer is constantly in contact with truck owners who insist that their trucks shall run exactly on schedule, this old saying now has a specific meaning.

The time (and money) saved by Fisk Truck Tires is a constant source of sales. The truck owner who uses Fisk Solid Tires or Fisk Pneumatic Truck Tires gets a mileage and a shock-protection from them which make him "boost" Fisk Truck Tires for you everywhere. Investigate the Fisk line—you will find that Fisk holds old friends and constantly makes new customers.

Next time—BUY FISK

The Fisk Ideal is: "To be the best concern in the world to work for, and the squarest concern in existence to do business with".

FISK TRUCK TIRES

grade like a bat out o' hell, and as soon as you see one, you bet you want to find a place to turn out. They'll take the outside edge and never slack up, if you've given 'em room to pass. Them young fellers are drivers, believe me. Make their fifty miles on the down grade in an hour and a half when they feel good."

In the old days—which, mind you, ended only a few months ago—the mail and passenger stage tore over this road in a day. It took three changes of horses, and elaborate feeding and stabling stations were maintained at three points between Elko and Tuscarora. Now one of them has been abandoned. A sign says, "This station closed" and it already has the desolate air of a desert place abandoned. The other stations are ranches, with water enough for irrigating, and get their supplies and ship their stuff, except droves of cattle, by motor.

Elko, the big city of Central Nevada, shipping and receiving points for mining and sheep and cattle range country running north a hundred miles to Idaho, and back into valleys in other directions for many miles, has become a definitely proven motor truck haulage terminal and distributing point. It takes a powerful and sturdy truck to fight the grades and sand in this locality. I saw one of the best rated makes, highly extolled by government experts for its reliable service in France, partly torn down, far out on a desert road. It costs a lot to have a truck quit under load in the middle of one of these desert hauls. And once anything gets a bad name in this country, it takes about a generation or more for the unfavorable tradition to die out. The trucks that have gone in there and proven their worth by pioneering will get the cream of the business, if backed by adequate dealer service.

Pneumatics Help Bad Roads

After the army truck train went through Nevada, that always gruelling stretch between Battle Mountain and Beowawe, on the Overland Trail, was said to have four places that were, by the severe standards of the locality, judged impassable. Whatever else the army truck train demonstrated, the impression in this locality gained ground that it would have been a gentlemanly and patriotic thing if it had cleaned up after itself. Pounding the bottom of already bottomless ruts clear down to China, the big caravan left other local and transcontinental travelers the choice of going around through unmarked and ungraded trails, or shipping by rail.

The route usually followed to bridge the gap between Elko and Golconda this fall, included 44 miles of the desert trail, over which supplies are hauled into the little mining camp which calls itself Gold Circle, and disdains the name "Midas," which some government clerk attempted to attach to the community by so designating its post office. This road goes through a country inhabited, so far as I was able to establish through personal observation, by one shaggy, brownish furred coyote, and one cute and confiding desert mouse, the shy kind that naturalists say is the rarest seen of desert creatures, but which in this locality is so unsophisticated and unknowing of mankind that it will eat mince pie crust crumbs from the hand. Otherwise sand and sagebrush occupy the big, mountain rimmed valley. Its floor is desert gravel, near the hills. Farther down, it degenerates to alkali pans, alternating with volcanic dust as fine as talc. Now the characteristic action of all this bottom, under motor traffic, is to puff out from under the tires, so that constantly going in the same rut wears it down to a point where rear housings drag. So, cautious, experienced drivers are constantly looking ahead, and choosing the least traveled of several alternative ruts, or breaking new ones through the untracked sand and sagebrush. In places these desert "highways" become suggestive of the phrase used by a motorized prospector "a labyrinth of ruts, a mile wide and a quarter of a mile deep. Whichever you start on will prove to be the worst of the lot when you get so far in you can't back out."

This spreading process on the Golconda—Gold Circle trail—has been happily, and most unexpectedly, checked by the operation of a pneumatic tired truck, which is freighting into the camp on a daily schedule. This truck travels at a rapid speed, depth of ruts and tortuous trail considered. The skill of the driver, and the remarkably exhibited tractive efficiency of the diamond-unit studded tread of the pneumatic tire, have their story effectively told by the visible tracks. This driver has practiced the art of weaving his way through the desert, on various trails without going to the bottom of the deep ruts. He is gradually rolling down the sides of narrow grooves, so rut bottoms are being filled. This process usually gives him a more or less steeply sloping rut wall to travel on. Of course, the tendency is to slip to the bottom. The surface is about the poorest traffic holder imaginable, slick and smooth underneath, covered with a layer of imponderable, fine, talcy powder. Yet for mile after mile the tracks show that this truck driver has picked his trail at speed, and the tires have stuck like the hoofs of a mountain goat to a sloping cliff, in defiance of all probabilities to the contrary. He is rolling out a pretty good trail, instead of spoiling the chances of getting through for himself and everybody else. Pneumatic tires are sure to win their way in desert trucking.

Road Program Awaits Public Education

Automobile traffic from now on will determine the development of main line road improvement in Nevada. Although in isolated spots there are found concentrated rich mines, and productive cattle ranges and agricultural valley tracts, Nevada is a state of small population, in widely separated groups. Although the state has the greatest per capita wealth of any in the United States, probably it is one of the hardest in which to levy taxes for public improvement. Before much can be done, some intelligent and progressive organization will have to first inform itself, and then "sell" the Nevada taxpayers the idea of highway development.

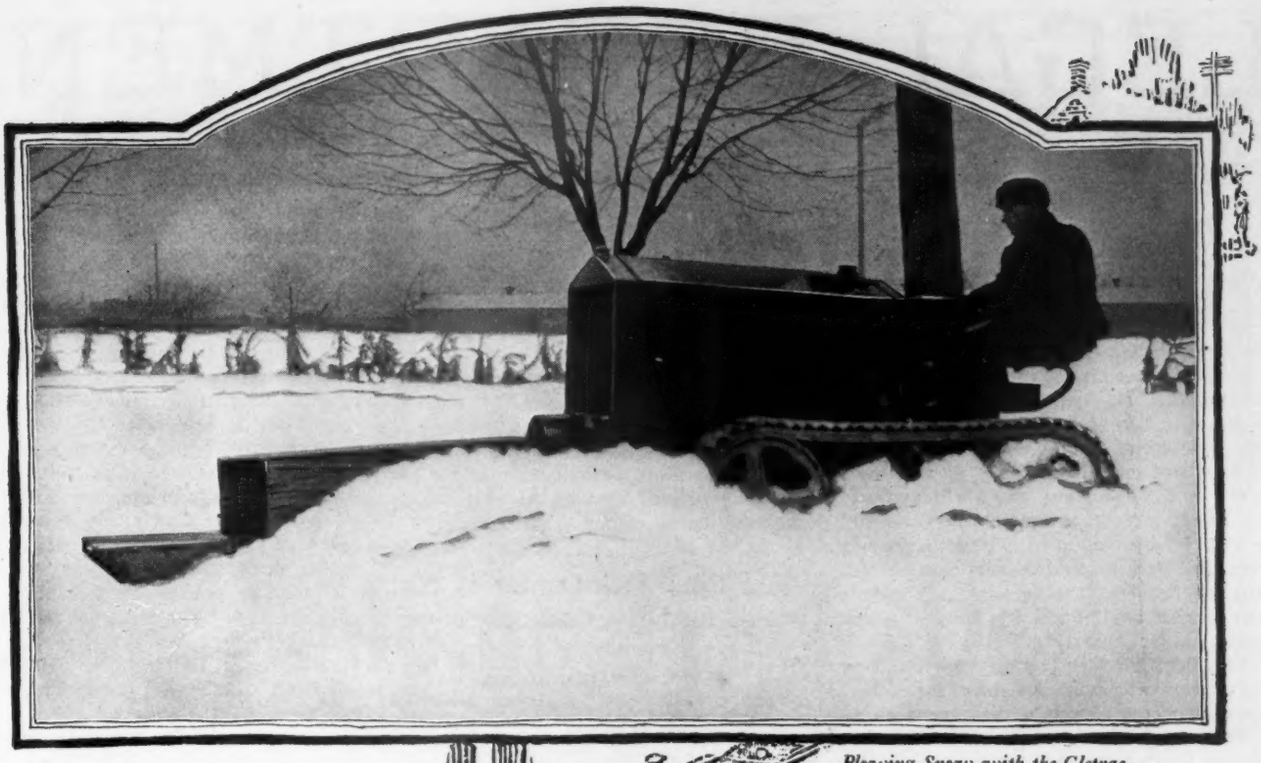
The first need is for a survey of existing routes carrying already a substantial automobile traffic, with a view to the elimination of pest spots in the nature of soft, bottomless rut producing sand flats, and grades which will tax vehicles carrying full load after they have fairly begun to experience the effects of normal wear. In every hundred miles of existing Nevada main line highways there is a very good percentage of high gear travel. Grade reduction in the worst pitches of the mountain highways, and concrete surfacing in the very wost spots of the soft desert, could fairly eliminate the worst spots in a program which would not be burdensome if carried out in a single year. Such a program offers the only opportunity for a state-wide start on road improvement. If it were inaugurated the resulting increase in motor traffic would be a great economic advantage, and would almost automatically indicate the location and method of further improvements which will naturally come with time. If Nevada fails to wake up to the needs of road improvement, five years of transportation progress will lead to a condition where one may fairly expect that pleasure traffic will jump the state by airplane. But freighting drivers will grin and plug sand and buck the pitches in the thin air of the mountain summits, and get through with their trucks. You have to see 'em do it to realize how good the manufacturers are turning 'em out these days. And, oh, boy, these lads that drive 'em! How they can drive!

The Weeks-Hoffman Co., Syracuse, N. Y., has recently entered the automotive gear industry. Mr. Willis H. Diefendorf is general manager and vice-president (member of the American Society of Mechanical Engineers and the Society of Automotive Engineers), and who for thirty years was actively connected with the New Process Gear Corp., in which concern he occupied the position of chief engineer and director.

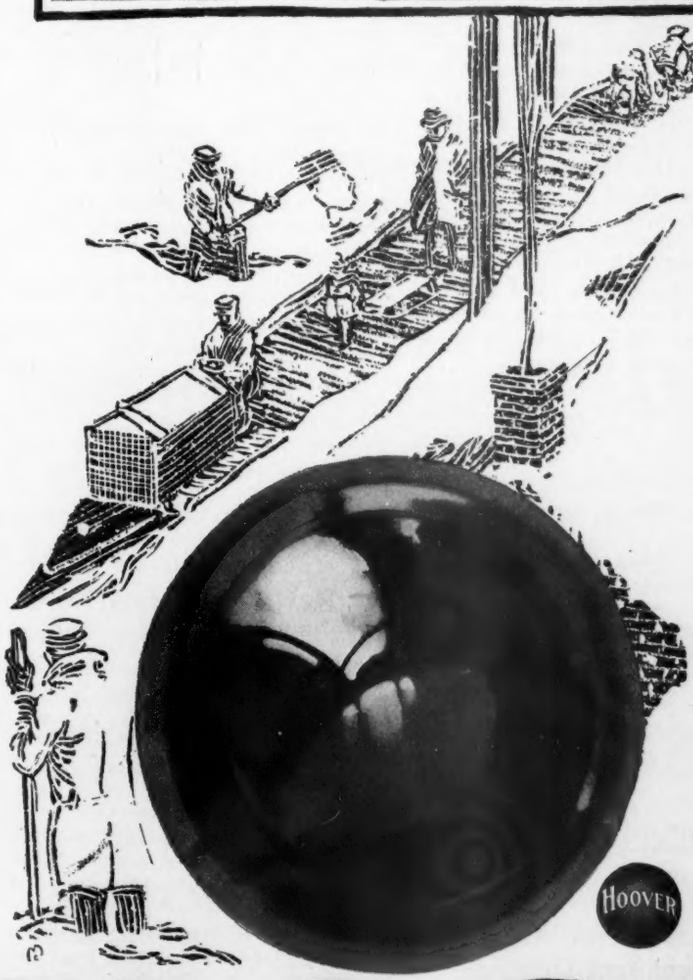
The equipment of this concern is all brand new and of the latest and most up-to-date design and calculated to produce the highest possible grade of product at a minimum cost.

The Warden Motor Sales Co., of Memphis, Tenn., have contracted to handle the Oshkosh 4-wheel-drive truck, made by the Oshkosh Motor Truck Mfg. Co., in the Memphis territory. Mr. Warden has been specializing in the sale of 4-wheel-drive trucks for a number of years in the Memphis territory and therefore, is well qualified to handle the Oshkosh 4-wheel-drive.

United States Good Roads Association will hold its eighth annual convention and exhibit at Hot Springs, Ark., April 12-17, 1920.



Plowing Snow with the Cletrac



Plowing through deep snow, when it is packed hard, requires tremendous power. It places an enormous strain on the shafts and the gears through which the power is transmitted. Ball bearings, by defeating friction here, relieve this intense strain and prolong the life of the mechanism.

It is interesting to know that Hoover Engineers have fashioned Hoover Steel Balls so round, so smooth, and so accurate that they make the operation of units, called upon to labor under immense strain, easy and free from ruinous friction.

HOOVER STEEL BALL COMPANY
Ann Arbor Michigan

HOOVER
STEEL BALLS

LEGAL DEPARTMENT

Scope of Bonds Indemnifying Against Motorbus Accidents

Wisconsin has a statute similar to laws in force in other states, in that it provides that persons or concerns carrying passengers for hire over established routes shall give bond conditioned to "pay all damages not exceeding $2500 to any one person or $5000 for any one accident that may be recovered against the operator of the vehicle" by reason of negligent use or operation, "while said motor vehicle is being operated in the service of a common carrier as defined by chapter 546, Laws of Wisconsin 1915."

The effect of this law in two important aspects was considered by the Wisconsin Supreme Court in the recent case of Enlers vs. Gold, et. al., 173 Northwestern Reporter, 325.

Plaintiff's husband was fatally injured when struck by a motorbus operated on a Milwaukee street by its owner, defendant Gold, and plaintiff sued on a bond given by Gold under the statute above mentioned.

The first question raised was whether Gold was operating the vehicle at the time of the accident as a "common carrier." It was undisputed that the bus was ordinarily used for that purpose, but that at the time of the accident passengers were not actually being carried. Gold was taking the car to a repair shop for the purpose of having repairs made on it. This question was decided in plaintiff's favor, the Supreme Court saying:

"Reason and good sense seem to us to require the holding that such a machine is being operated 'in the service of a common carrier,' not merely while it is carrying passengers on its route, but while it is running to a repair shop to receive the repairs necessary to enable it to continue its service as a common carrier."

The other important question raised in the suit was whether recovery was to be limited to $2500 or $5000. The bond provided for payment of "all damages not exceeding $2500 to any one person or $5000 for any one accident." And it was argued on the part of the surety on the bond that plaintiff could not recover more than $2500. But the court holds that there were damages to two persons, within the meaning of the bond—damages to the deceased man's estate and damages to the widow in her individual capacity in being deprived of the support by, and companionship of, her husband. Had the accident not proved to be fatal, all damages recoverable would have been limited to the victim of the accident—damages to "one person." But since the accident resulting from defendant Gold's negligence caused dual damages—to the decedent's estate and to the widow in her own right—the $5000 limit applies.

Verdict in plaintiff's favor was set aside and a new trial granted, however, on the ground that the jury made inconsistent findings on questions concerning whether Gold actually drove his car in such negligent manner as to have an actionable cause of the accident.

When the Truck Owner is Not Liable for Driver's Negligence

A motor truck having been sold, the selling manufacturer furnished a man to instruct the buyer's employee how to drive it. One evening, while the two men were operating the car in Boston, the buyer's employee driving, plaintiff, a pedestrian, was negligently run down and injured. She sued both the seller and the buyer of the truck for damages. A trial resulted in the seller being exonerated, but the jury returned a verdict against the buyer.

Reviewing the case on exceptions taken by the defendant buyer, the Massachusetts Supreme Judicial Court has set aside this verdict on the ground that the trial judge committed error in refusing to give the jury the following instruction:

"If, at the time of striking the plaintiff, the operator of the automobile was driving it for the sole purpose of going to his own home, he was acting outside the scope of his employment, and a verdict should be returned for the defendant."

There was evidence tending to show that at the time of the accident, about 8 p. m., the men on the truck were driving to the buyer's employee's house with a quantity of beer. In this view of the case, the court holds that it was incumbent upon the judge to clearly apprise the jurors on the point of law that an employer is liable for injury to a third person, caused by negligence of his employee, only when the latter is acting within the scope of his employment, and not when he is engaged in performing an errand for his own benefit.

Who Are Liable for Accidents Due to Negligent Driving?

The Diamond Coal Co., Los Angeles, has won a case in the California District Court of Appeal, involving a claim against it for injuries sustained by one Luckie, who was unlucky enough to be injured in a collision between an automobile in which he was riding and a motor truck bearing a sign indicating that it belonged to the coal company (183 Pacific Reporter, 178). Summarized, the principal points decided by the court are as follows:

The California law, which requires every motor vehicle to carry a red light in the rear when operated between certain hours, and which provides that "no person shall allow a motor vehicle owned by him or under his control to be operated" in violation of such requirement, does not impose any obligation against the owner of a vehicle to see that the rear light is kept burning, while neither he nor his employee is operating the truck; the owner is not liable for violation of the statute by a lessee or borrower of the vehicle.

If the defendant company leased its motor truck to one who was given an option to buy it by completing certain payments, the fact that the lessee contracted to use the truck in hauling coal for the company did not render the company liable for negligence of the driver while performing such contract; the circumstances being such as to show that the lessee was acting as an "independent contractor," and not as a mere delivery employee of the company.

In this case it appeared that the lessee conducted an ordinary independent haulage business determining for himself how the truck should be loaded, routed and cared for, and employing and discharging his own drivers, whom he paid. And the court holds that the mere fact that the coal company retained title to the truck pending his payment for it did not hold the company responsible for negligence in its operation.

Revoking Pennsylvania Licenses

A law passed at the recent session of the Pennsylvania legislature provides for the revocation of the registration of a motor vehicle, or the license of a driver, on a certificate made by the commonwealth's public service commission that the vehicle has been operated as a common carrier of passengers without the approval of the commission. But section 2 of the act provides for reinstatement of the registration or license, with the consent of the public service commission. A fee of not less than $5 must be paid for restoration of the registration or license. And it is provided that revenues derived under the act shall be expended by the state highway department for the purpose of assisting in the construction, maintenance, improvement and repair of state highways and state-aid highways

The Resiliency is Built in the Wheel

A Sales Expansion Program

of Particular Interest

to

Every Motor Truck Dealer

The ***necessity*** and ***demand*** for RESILIENCY in motor truck operation is now an established fact.

This demand must be met and supplied in a form that is most ***practical*** and ***permanent,*** a form of RESILIENCY that every motor truck dealer can ***safely*** recommend to any of his customers

AND THAT IS IN

Sewell Cushion Wheels

Each day witnesses a large increase in demand for Sewell Cushion Wheels from truck dealers and owners throughout the country.

The new Truck Dealers' Co-operative Policy which we have inaugurated should concern every motor truck dealer.

A large National Advertising Campaign in National and Trade publications together with our extensive Sales Organization of 38 branches is in operation to "sell" every truck owner Sewell Cushion Wheels.

IT WILL BE TO YOUR ADVANTAGE

to write us at once for full particulars regarding our Truck Dealers' Co-operative Policy and we can show you how it will be to our mutual advantage in doing so.

SEWELL CUSHION WHEEL CO., Detroit, U. S. A.

Truck Being Used as Moving Meat Store

Butcher Sells Meat From Truck on Route. Eliminates Store Expenses

By JAMES W. COTTRELL

THE retail sale of meats and vegetables presents a delivery problem different from that of almost any other commodity. Housewives like to see and select the particular cuts of meat and will often change their minds about what to buy when shown a nice roast or some new fresh vegetables.

But to select meat in this way requires a trip "downtown" or to "the market," which may be very inconvenient on account of distance or other duties in the home.

If meat be ordered by phone the personal selection is impossible and customers are often dissatisfied with the goods delivered.

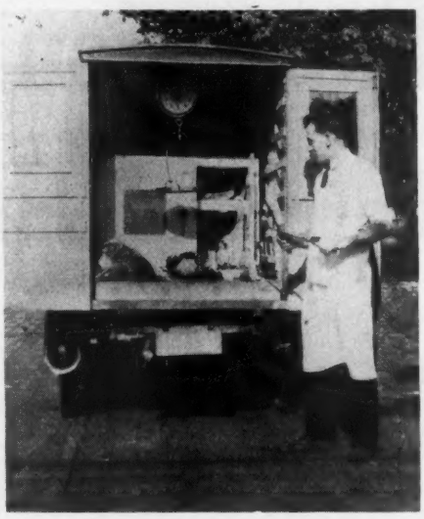
A very satisfactory solution of the problem has been worked out by Mr. George Eckhardt, of Hammonton, N. J. He uses a ¾-ton truck with a special body and carries the meat and vegetables to the customer.

In his side yard he has a building 18 ft. by 24 ft., which is used to house the truck and for the storage of meats and vegetables. All of this section is screened in the summer.

The truck has a light chopping block in the rear of the body. Directly forward of this is an ice box, which was homemade with glass in each of its doors. A spring scale is hung from the roof of the body over the block. Shelves in the front of the body hold vegetables.

Meat is transferred from the large refrigerator, chilled, right into the ice box on the truck and therefore very little ice is needed to keep the meat in condition. Of course, in winter no ice is needed.

A regular route has been laid out allowing calls at the home of each customer. The truck covers the route on making separate trips to each home from the shop.



The route was started using a wagon and horses. Then a remodeled Ford touring car was used for two years. The business increased to such an extent that a ¾-ton Atlas truck was recently bought.

The outstanding advantage in the use of trucks is the saving of time or, rather, covering a larger territory in the same time. The very nature of the business requires Mr. Eckhardt to drive the truck himself, cut the meat, and make sales to customers. Hence time saving is important.

During the war Mr. Eckhardt extended his route to Amatol, a town built in connection with an Ordnance loading plant, located 8 miles from Hammonton.

Mr. Eckhardt frequently buys poultry and other farm produce direct from the farmer, utilizing his truck while on these farm-side ercursions to haul his purchases. The use of the truck for this purpose has a double value; first, it results in a big saving of time; second, it enables Mr. Eckhardt to buy direct from the producer, eliminating double freight charges and middleman profits.

Above: Rear View of Truck Body. Note Chopping Block on Floor of Body, Ice-Box and Scales
Below: Three-Quarter Ton Atlas Truck With Special Itinerary-Butcher-Shop Body

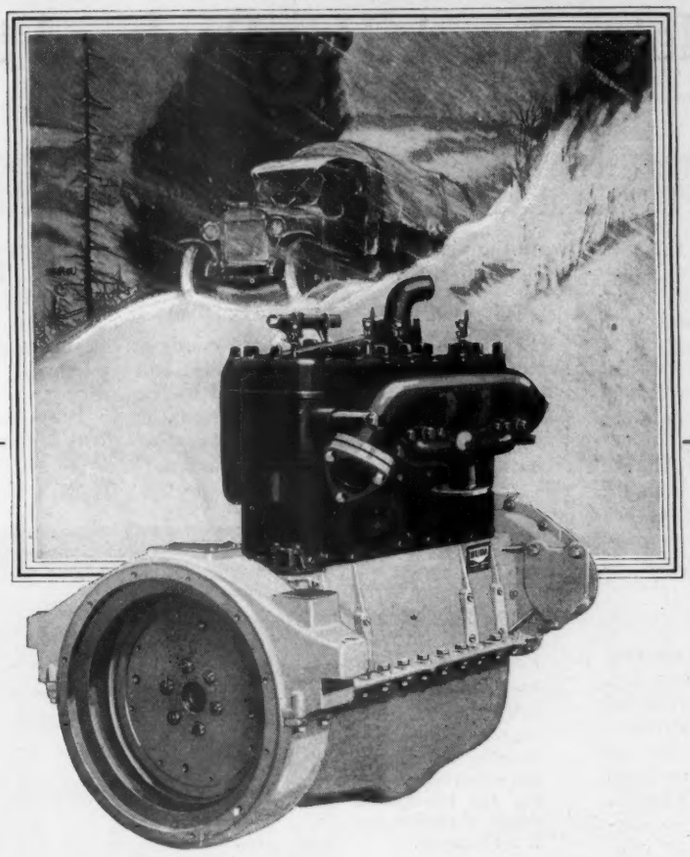
The continued success of Mr. Eckhardt's plan of selling and delivering direct from a truck suggests a wider use of the idea. In view of the extensive clientele that can be established by this manner of merchandizing and the elimination of the many expenses incident to the maintainence of a store in the business section the institution of a fleet of trucks to canvass various local districts would be a successful undertaking.

Tuesday, Thursday and Saturday of each week. Each customer knows about what time to look for the truck. When it arrives, she makes her selection, the meat is cut and delivered right there.

There is a decided advantage in operating the truck over a definite route, including all of the customers, rather than

Motor Snow Plows Effectively Clean Chicago Streets

A fleet of seven Mack Motor Snow Plows is operated by the Bureau of Streets in Chicago, to keep it's highways clear for continuous service. Their speeds makes them ideal for removing the snow while it is falling. The plows are attached to the front of the trucks, and are demountable. The trucks have dump bodies so that they can be utilized the year 'round. Each plowshare bears the motto "Help Keep the City Clean," which Chicago is doing through an efficient Bureau of Streets.



Not every truck maker can secure the Buda engine. For a Buda installation carries a pledge of right truck design, a faithfulness in manufacture, and proven practicability.

To preserve the good performance name of the Buda engine and shield truck purchasers from uncertain accomplishment, Buda engineers carefully investigate each Buda-equipped vehicle.

This assurance of a correlated engine and chassis competence means the right engine in the right truck, a certainty of ample power, and low operating costs per ton or mile.

A Buda engine in your truck brings that distinctive selling ease which comes with an engine of proven mechanical excellence and whose true performance value is being impressively carried to your potential customers by extensive advertising.

The latest Buda engine features will be on view at the Boston Motor Truck Show, Space E 420, and at the Minneapolis Tractor Show. A really cordial welcome awaits you at the Buda booth.

THE BUDA COMPANY, *Harvey* (CHICAGO SUBURB), *Ill.*
ESTABLISHED 1881

BUDA
The
ENGINE

How the Motor Truck Has Replaced the Freight Car in Cincinnati

Unique System is Evolved, Whereby Two Hundred Bodies and Fifteen Trucks Are Utilized at a Great Saving of Both Money and Time

FREIGHT moves through the railroad yards of Cincinnati today without confusion or bustle. There is no congestion. Cincinnati, with respect to freight, is a city into which shipments are received, and through which shipments pass with less waste of time than anywhere else in the United States.

The motor truck has brought about the transformation. It has made possible a system of inter-road transfers that has replaced the freight car, and is in the way of becoming standard for every city in the Union.

New Regime But Recent

Not so long ago Cincinnati was a city which traffic managers preferred to avoid. It was like a clot in the main railroad arteries to the south and southwest. Freight moved through it sluggishly. If a miscellaneous shipment came in from the east over the Pennsylvania lines, it was likely to be held up a week in Cincinnati. The transferal of part-car consignments from one road to another was an aggravatingly tedious proceeding.

The progress of part-car freight was about like this: The freight would be unloaded at the Pennsylvania station. This was one operation. Then it waited at the depot until a "trap" car was ready for it. The loading of this "trap" car—which is simply a freight car used for transferring freight from one railroad terminal to another—was operation number two. After it got under way, the "trap" car usually was shunted about the yards for three or four days. If it was bound for the Baltimore & Ohio depot, or the Big Four, it arrived in the due course of time, and was unloaded. This was a third handling. Lastly, the shipment would be transferred from the platform to another car and sent on its final way.

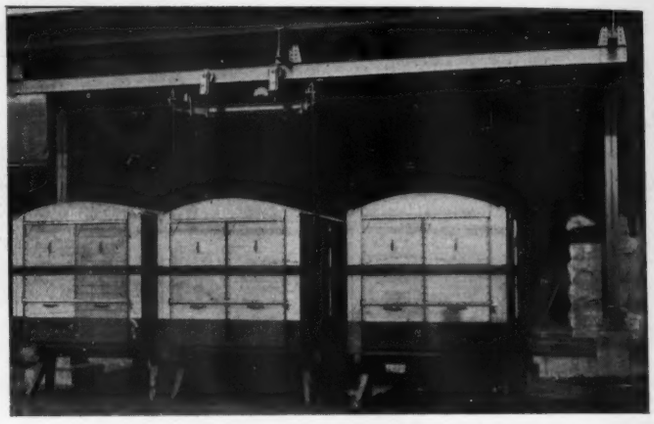
Acute Congestion Demanded Solution

It was this state of affairs—cumbersome and costly for the railroads, and irritating for the shipper—that led to the discovery of a new duty for the motor truck, and the organization of the Cincinnati Motor Terminals Co. Cincinnati was selected for experiments in preference to other cities because its condition of congestion was most acute.

B. F. Fitch, a former railroad man, asked himself this question: "Why wouldn't it be feasible to make motor trucks take the place of trap cars?" And Yankee-like, having asked himself the question he immediately proceeded to answer it.

That was four years ago. Two White trucks were put on duty carrying freight between stations. But instead of backing a truck up to the loading platform and leaving it there to be filled, the Cincinnati man devised a system of detachable bodies. These bodies are lifted off the trucks by means of an overhead traveling crane, which engages four rings with hooks provided on the bodies for this purpose. The crane is operated by a motor.

When a truck rolls up to the station with a load of freight, the whole body is lifted off the chassis, another loaded body is lowered on to the chassis and the truck spins away—the whole operation taking but a few minutes. One body is left to be unloaded—the other is carried to another station.



Showing Freight Bodies Removed From Chassis Prior to Loading or Unloading.

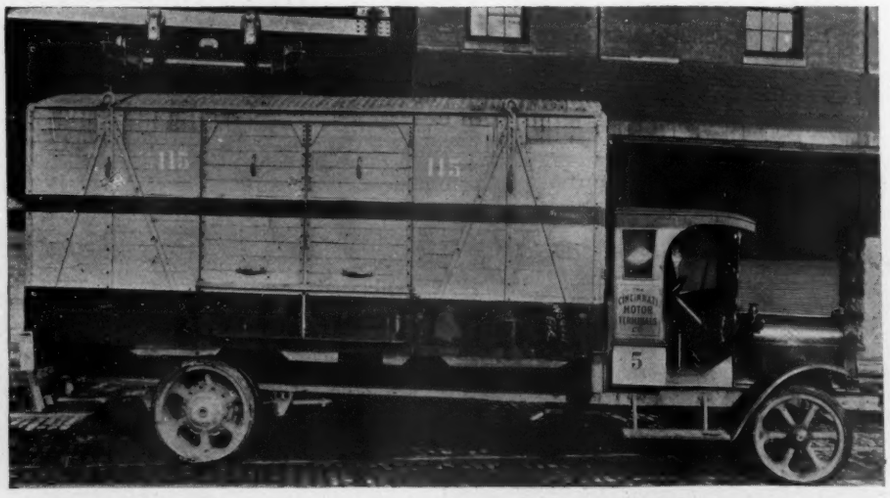
These bodies are numbered for identification and sealed before leaving the terminal so danger of possible loss is not incurred.

The original two White trucks have now been increased to fifteen, while in all, 200 bodies are in use at the various railroad freight depots. The bodies are designed to carry 4½ tons.

New System Makes Transfers Direct

A typical example will show how the system works. If a car filled with miscellaneous consignments from Detroit arrives now at the Baltimore & Ohio station, that part of it which must be transferred direct to the Pennsylvania station is loaded into a Pennsylvania station body; that which is destined for the Big Four is transferred direct to a Big Four body. When the bodies are filled, the doors are sealed by railroad employees, trucks drive up, the bodies are lowered on to them and the transferred freight is carried direct to the other railroads. There are but two handlings of the freight, where before there were four. The whole operation takes at most but a few hours, where previously the transfer of part-car shipments of freight from one station to another required three days, four days, or a week.

The movement of trucks in the Motor Terminals Fleet is directed from the main office of the company much as a train dispatcher directs the movements of trains. When a body is ready, the truck dispatcher is notified, and a truck is sent to the depot needing it. There are no definite schedules, except that it is usually



One of the White Trucks With Freight Body Employed by the Motor Terminals Company in Solving the Freight Congestion Problem That Existed in Cincinnati a Few Years Ago

Note how the lift which is exerted at the hooks when lifting the body from chassis is distributed by steel straps over a large area of the body sides. Attention is also called to the Dayton steel wheels which are standard equipment on the entire fleet.

America's Chief Industrial Need

AMERICA'S chief industrial need at present is not only increased production—but increased QUALITY in its increased production. It is vital not only in our domestic markets, but also in the world's markets overseas where need of goods has flung the gates open for a time—but only QUALITY of goods can prop the gates open for all time.

To the automotive manufacturer seeking to produce a quality car in quantity, SKF's foresight in organizing a scientific research for the study of bearing application and design is of value, we believe. For it enables the manufacturer to place his bearing problems in the hands of this technical staff with the assurance that a sincere attempt will be made to solve them.

This scientific, specialized engineering service is offered not only to those quality car manufacturers who have already accepted the bearings produced by SKF as the highest type of anti-friction device, but to all others who recognize both the individual's and the nation's need of higher quality in our increased production.

S K F INDUSTRIES, INCORPORATED
Sales, Service and Research Division
165 Broadway, New York City

(877)

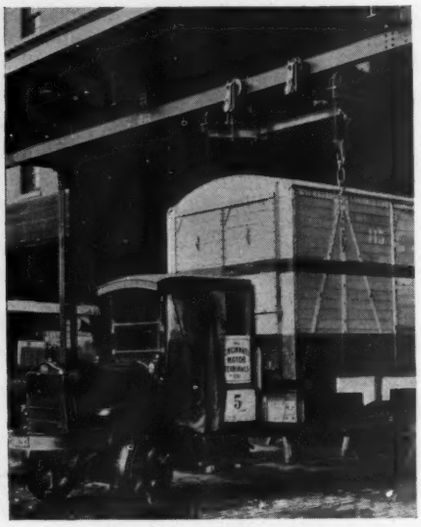
SKF INDUSTRIES

Hess-Bright Ball Bearings
S K F Ball Bearings
Atlas Steel Balls
Gronkvist Chucks
Transmission Hangers

arranged to have bodies ready at 8 o'clock every morning at every station.

Trucks Are Equipped With Dayton Steel Wheels

An interesting feature about the trucks themselves is that all the trucks are equipped with Dayton steel wheels. The practicability of steel wheels is substantiated by the service—involving a tremendous strain on wheels. Yet it was no longer ago than four or five years that steel wheels were looked upon with something both of skepticism and distrust. In such work as the trucks of the Cincinnati Terminal Co. are called upon to perform, the natural supposition would be that tire costs must be high—yet in every instance more than the guaranteed mileage has been secured.



This View Shows the Loaded Body Suspended Above the Chassis

The rings of this traveling crane engage with the hooks furnished on the body.

But while bringing out the potentialities of steel wheels, the big thing that has been accomplished in Cincinnati has been replacement of freight cars with motor trucks, vast relief for the congested Cincinnati terminals, and some quite impressive economies.

Enormous Saving Incident to New Scheme

It has been computed that the system saves over 300,000 switch-cut movements a year—or approximately 1000 switch cuts every working day. It is officially given out also that 80 freight cars daily are released for main line traffic that otherwise would have to remain tied up in the freight yards for duty as trap cars. As a freight car is said to be worth from $60 to $90 a day, the saving to the railroads particularly is immense. As mentioned above, the time for transferring freight has also been vastly reduced—under the old system the transfer time per ton-mile was 12 hours and 18 minutes; under the motor terminals system the time per ton-mile is just two and eighteenth hundredths minutes. The United States Railroad Administration has also stated officially that in addition to the time saved, there is also a saving of fifty cents a ton-mile of collateral savings on cars and switchings.

Under current conditions, the total freight transfers in Cincinnati amount to about 1100 tons a day. Of this the Cincinnati Terminals Co. is handling 600 tons, at a ton rate of 80 cents—the railroads furnishing all the labor for loading and unloading. The Terminals Co. expects in the course of a few months to handle all the full volume of the transfer business. Its investment in equipment, time and experiments is placed at about $600,000. Later it is proposed to extend the system to every city in the country where freight transfer service is required on a sufficient scale to warrant it.

Quite naturally, since practically the entire system is the result of inventions and original thinking by Mr. Fitch, it has been patented. The patents are held by the parent company, The Motor Terminals Co., New York and Cleveland.

Tonnage Rating System Obsolete, Says Packard

Factory tonnage ratings on Packard trucks are to be eliminated, and hereafter all models will be designated without reference to capacity, according to an announcement issued by the Packard Motor Car Co. In other words, the term "three-ton" truck, for example, is taboo. It will be known as "Size D." This radical step is in accordance with the company's plan of "selling the truck to fit the job."

"We are wiping out a trade custom that is not only unfair to our trucks, but is misguiding to the buying public," says the announcement. "The old system of factory tonnage ratings confuses the problem of truck transportation, and in condemning it we are clearing the way to a better understanding of truck performance.

"What can be expected of a 'three-ton' truck? The term implies that it is the only adequate vehicle for a three-ton load; that it will carry the three-ton load efficiently from one point to another, regardless of conditions. As a matter of fact, the load may best be hauled on a truck ranging from one and a half tons to five tons, depending entirely on the conditions existing where the hauling must be done. At its best, the factory tonnage rating is a crude estimate of truck performance, and the automobile industry can no longer tolerate crude estimates.

"By building into our trucks a large factor of safety, and by putting our transportation engineers at the service of purchasers, we have done much to remedy the evils of misunderstanding springing from the old system. The elimination of factory tonnage ratings is the next logical step. In other words, we are going directly to fundamentals. We shall take each truck sale as a distinct problem in hauling, and our engineers will advise the purchaser as to the truck he needs to meet his individual requirements. One of the first benefits of this new system will be the minimizing of over-loading, which is the most common abuse to which trucks are subjected, and which is largely due to the lack of definite information on truck performance.

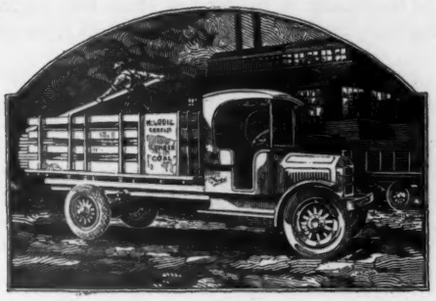
"Packard trucks will carry their rated loads whether conditions are good or bad, but a purchaser whose conditions are good should not be led into buying more truck and more reserve performance than he needs. On the other hand, the purchaser whose conditions are unusually bad should be made to realize that a good measure of reserve performance will insure him against wasteful depreciation. Any system of rating that does not take into account the variety of conditions under which trucks are to work is inadequate."

Hereafter all Packard trucks will bear a plate on which will be stamped the name of the purchaser and the duty for which the truck is sold. In case of resale, the Packard engineers are to be consulted for the purpose of giving a new rating to the truck if the change in conditions requires it.

Special Body for Ice-Cream Delivery

H. H. Neuman Company, distributors of ice cream in and around York, Pennsylvania, use a special body mounted on a pneumatic-equipped Federal three and a half ton truck. The body is divided into removable compartments for freezers, brick ice-cream cans, salt and ice.

GARFORD



Nothing so clearly demonstrates sound engineering and right manufacturing as the ability of Garford Motor Trucks to give

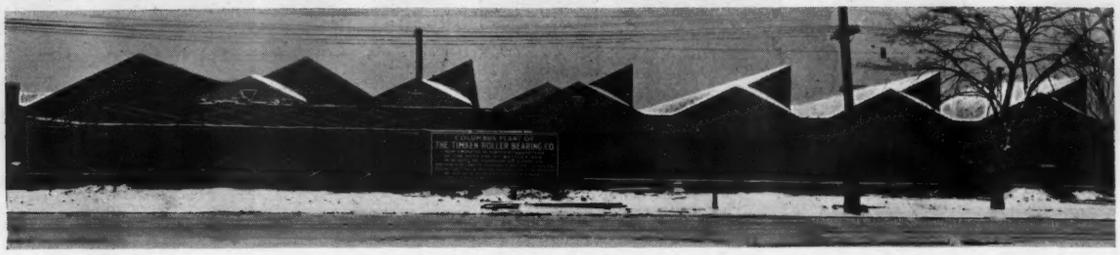
—'Low Cost Ton-Mile.'

Garford

Lima, Ohio

TRUCKS

New Timken Plant Complete Production Unit



This Picture Gives an Idea of the Breath of the End of Main Building, About Three Hundred Feet. It is of the Saw-Tooth Type, Seven Wide, of Structural Steel

IN order to furnish an uninterrupted source of Timken products to the industry, the Timken Co. was forced to expand, which it has done in the construction of a new and complete plant at Columbus, O. This is a complete bearings production unit representing in its up-to-date buildings, equipment, and plan an investment well over two million dollars. It, with a maximum enlargement at the Canton plant assures a steady and dependable source of supply.

The main building—approximately 500 x 300 ft.—when completed, will be without partitions. The cold weather however, necessitated that if machine work on a precision product were to be well done, it would be necessary to enclose that part of the shop where the work was actually being carried on; consequently as the sides, roofs and floors are finished, the temporary partitions are moved so that one-third of the floor space of 140,000 sq. ft. has been given over to actual production while the remainder of the building is being finished.

The heat-treating plant, also a structural steel building of about 15,000 sq. ft. is a model up-to-date efficiency of organiation in the heat refinement of steel. It measures approximately 300 x 60 ft.

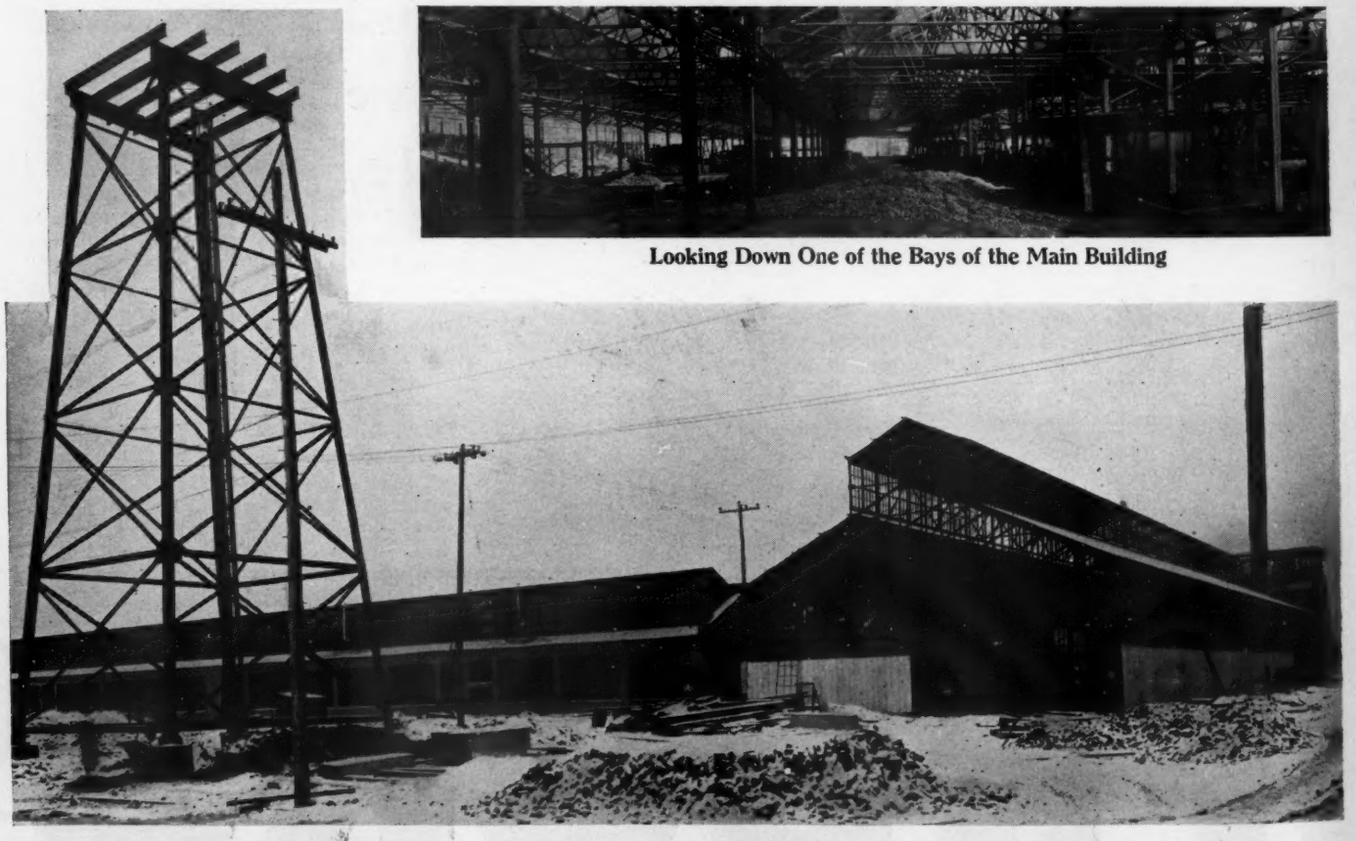
The installation at Canton of its own source of raw material supply was Timken's means several years ago, of meeting the then of normal demand. Now extensive enlargement in the steel and tube mills at the home plant just nearing completion, will enable the Timken Co. to furnish its new plant sufficient raw stock instead of supplies.

Columbus, O., was selected as a place where the Timken Roller Bearing Co. could best fill its capacities as a large agency toward the development of the automotive industry. The plot in Columbus, upon which the Timken Roller Bearing Co. has erected its buildings is slightly more than nine acres. It is within ten minutes' street car ride of the downtown district and even closer to substantial residential districts. Both Cleveland Ave. and Fifth Ave., upon which it is located, are paved highways, Cleveland Ave. carrying a main street car line.

Trailmobile Builds New Factory

The Trailmobile Company has just completed a large factory at Oakley, Ohio, a suburb of Cincinnati. This factory which will be devoted exclusively to the manufacture of trailers for motor vehicles will enable the company to meet the largely increased demands for its products.

Looking Down One of the Bays of the Main Building



A Prospective of Timkin's New Two Main Buildings. The Bearing Factory is on the Left and the Heat-Treating Plant on the Right. Much Consideration Was Given the Question of Ventilation and Lighting

MARTIN
CUSHION WHEELS
FOR MOTOR TRUCKS

No Bolts
No Nuts
Pressed on
Throughout
Light
Strong
Resilient
Durable

Backed
by
Nine Years'
Experience
in Building
Good
Cushion
Wheels

Adopted for Standard Equipment on
"OLD RELIABLE" MOTOR TRUCKS
1½ to 7 Ton

MARTIN CUSHION WHEEL CO.
311-13 N. SANGAMON STREET CHICAGO, ILLINOIS
BRANCHES AND SERVICE STATIONS IN ALL PRINCIPAL CITIES
PRICES ON REQUEST

Truck Dealers and Salesmen and Their Wives on Arrival at the Rock Island Station, Lincoln, Nebraska

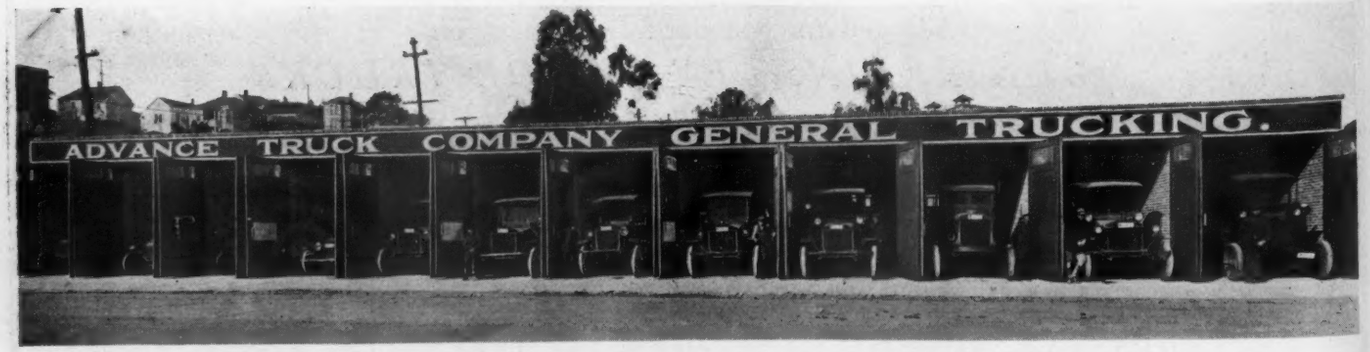
A large representation consisting of about one hundred and seventy-five distributors, dealers and salesmen of the Patriot Truck from the states of Texas, Louisiana, Oklahoma, Kansas, Colorado and Nebraska were in attendance for the three-day session, held by the officers of the Hebb Motors Company, at Lincoln, Nebraska. The Southern distributors placed orders with the factory for immediate shipment aggregating more than a million dollars in value, and signed contracts for 1920 for a sum in excess of four million dollars.

Garage Tunneled Into Side of Mountain

A very interesting and unique incident in the way of providing a home for motor trucks is that in the picture at the left, which shows the entire fleet of trucks owned and operated by the Pittsburgh Coal Company, Pittsburgh, parked in front of their garage which has been built back into the mountain alongside of the road. The mountain was tunneled into, and constructed inside with brick. As may be seen, entire fleet is Sewell Cushion Wheel equipped.

First Pneumatic-Equipped Dump Body

According to the Firestone Tire & Rubber Company, this Ace Truck is the first dump body job that has ever been equipped with pneumatic tires. It has been delivered to the Canton Feed and Milling Cympany, of Canton, Ohio, and is intended for city hauling.



Novel Housing Arrangement for Fleet Owned by the Advance Truck Company, Los Angeles, California

This unit consists of twelve stalls, each of sufficient depth to house a five-ton truck and its trailer. Attention is called to the brick fire walls between the stalls which extend two feet through the roof. The timbers of this roof are staggered, so that no wood extends through the various partition walls. Each compartment is also provided with a lubrication chart for the particular truck that is kept there, and also a fire extinguisher in addition to the regular equipment carried by the truck.

The Truck Tire That Makes Lasting Friends

JOHN S. BAISDEN, INC.
DISTRIBUTORS OF
GOODYEAR TRUCK TIRES
PNEUMATIC TIRES AND ACCESSORIES
SEATTLE, WASH. Dec. 4th 1919.
Polack Tire & Rubber Company,
New York.
Gentlemen:-
ATTENTION OF MR. HOFFSTAEDTER:
We have what we believe will be good news
for you. After the First of the year we will handle
only Polack Truck Tires. We are cancelling our Goodyear
account. This will mean that we will have to have
about $200,000 worth of Polack Truck Tires this year
or more. Kindly let us know immediately how the stock
situation stands. Whether you can supply us with the
tires that we will need.
Why do we not receive some 36 x 8. Pierce
see that we get some of these on the way immediately.
What do we receive on specifications?
January First we will have five (5) Salesmen
[out retailing Polack Truck Tires.
I don't know what you do back in New York
but we will load this territory full of your products.
Send us cards:-
J.S.Baisden, Inc. Tire Experts
624-Union
with the following names printed:-
J.S.Baisden
R.A.Stewart
P.G. Baisden
Jack Stewart
C.H.Lyons.
Let us know any other way that you can co-
operate with us and other information.
Give my best regards to Mrs. Hoffstaedter
and wish her as well as yourself a very Happy and Pros-
perous New Year.
Yours very truly,
J. S. BAISDEN, INC.
By
J3/0
POLACK TYRE & RUBBER CO

SUPERIOR Service can only mean Superior Quality that holds such firms as John S. Baisden, Inc.

Because of their exceptional wear-resisting quality it is inevitable that Polack Truck Tires should continue to give *year after year satisfaction*.

Years of specialization with one product—the pioneer of all Truck Tires—have established Quality in Polack Truck Tires on a certain scientific basis that assures Truck Users fine service as consistent as it is exceptional.

Dealers can take advantage of the attractive money-making opportunity in selling Polack Truck Tires to the best class of truck users.

The superior performance of Polack Truck Tires in all lines of business assures Dealers a constantly-growing volume and the lasting good-will of their customers.

With a product that is right, a price that is right, and an adjustment basis that is an established fact, not an innovation, the Polack Dealer proposition undoubtedly offers an attractive money-making opportunity.

POLACK TRUCK TIRES

SINCE 1899 WORLD'S STANDARD

—complete in both Regular type and High Crown type.

—enable Dealers to dominate the best and most profitable truck-user business in their territory not only the first year, but every year.

Write for full details of Polack Dealer Proposition in open territory

POLACK TYRE & RUBBER CO.

1876 BROADWAY, -- NEW YORK.

Service and Repair Departments—*Continued From Page 53*

of this type should not be used for capacities over 1100 gal. When constructed of heavy metal they should not be less than 3-16-in. plate.

Do not use tanks for gasoline storage of less than 1000 gal. capacity and stations having large gallonage sales or located at extreme distance from the bulk storage should use 2000 gal. tanks or larger. Nothing can be more detrimental to a station than to have to say to customers "No Gas." Large storage also greatly helps to reduce delivery cost.

It will be found more satisfactory to use a separate tank for each pump, as it will prevent the putting out of service of more than one piece of pumping equipment in the event of a tank becoming temporarily out of use for any reason. Before installing, have the tank carefully strapped and measured with an accurate steel tape and carefully preserve the measurements for use in gauging the tank. Two tanks of the same rated capacity, no matter by whom built, will not measure up the same. If the tank is placed in loose sand or ground which is subject to being filled with water, the tank should be strapped to an oak or concrete foundation.

Tanks not galvanized should be given one heavy coat prepared from the following formula: Mix cold by carefully stirring four (4) parts of Portland cement in three parts of kerosene oil. This mixture is then stirred into sixteen (16) parts of coal tar. Paint should be freshly mixed and kept well stirred. This will add greatly to the life of the tank.

In only a comparatively few cases will the fill box be located directly over the tank. It is good practice to place a fill box and cover at the ground or pavement surface. Be careful to see that the tank is properly vented.

Tank trucks are being built with larger piping in order to insure more rapid unloading. Delivery costs and relative congestion around your station can be materially cut by having all tanks equipped with 4-in. fill pipes.

Tanks should be placed reasonably close to the pumps which they serve. Usually not over one hundred feet away.

The usual method is to place them near the driveway under a grass plot. All of the piping and the fittings for the gasoline system should be galvanized and all joints should be laid up with litharge and glycerine.

Fill boxes should be so located that trucks standing at them to unload will not obstruct either driveways or pumps. It is a good idea to carry the fill boxes to the curb line. If the street is one that does not have too heavy a traffic and the city ordinance will permit it.

Insist that every pump used for the sale of gasoline bears the inspection plate of the National Board of Fire Underwriter's Laboratories. A great many municipalities demand this in their ordinances, and it certainly is an asset when taking out fire or public liability insurance. They should also conform to the specifications of the Bureau of Standards who have decreed that when pumps are so built they constitute accurate measuring device.

Pumps should be what is known as the 5-gal. type rather than those discharging a smaller quantity and should be equipped with a filter.

If you are unable to take care of your trade, investigate very carefully instead of saying that the pumps are too slow, and it will be found that it is more pumps that are needed, not faster ones.

Do not use pumps known as inside pumps for work outside. They are not provided with a housing to protect them from the dust and dirt and in cold weather are apt to freeze.

In order to give the best results, pumps should be placed on concrete islands in the center of driveways in such a manner that cars can drive on either side of them. The number of pumps to be used depend on the probable gallonage, the number of grades of gasoline to be handled and the rapidity with which the cars must be handled during rush hour periods. The grounds and driveways should be so planned that extra pumps can be added in the future. The piping, tank and concrete islands for extra pumps should be installed at the time the station is built. The islands, when used for a single pump, should be about 7 in. high, 3 ft. wide and 6 ft. long, with a foundation of about 2 ft., depending on the soil. When two pumps are placed on the same island, they should be at least 11 ft. apart.

Do not place pumps in such a position that when a car is being filled, at either the dash or the rear, that any part of the car will overhang or be on any part of the sidewalk.

Remember that your pumps are machines pure and simple. They are like every other machine and must be cleaned and oiled at stated intervals in order to give the best service.

Kerosene and Lubricating Oils

There are several methods of storing and dispensing kerosene and lubricating oils. Very few stations will find it profitable to handle kerosene oil. However, when handled, it should be stored in an underground tank of about 500 gal. and dispensed through a kerosene measuring pump placed inside of the building.

Lubricating oils are usually carried in three grades—light, medium and heavy. They were stored originally in light metal round tanks holding approximately 1½ bbls. and drawn out by means of a tin non-measuring plunger pump. This method proved to very very inaccurate, wasteful and dirty, and was superseded by heavy metal, square or round tanks of approximately one barrel capacity and equipped with self-measuring one or two quart pumps.

During the past two years another method has been gradually getting a foothold, which is both clean and efficient.

It consists of using quart or half gallon self-measuring floor pumps installed inside of the building and served from a one or two-barrel tank installed either in the basement or underground outside of the building. In either case the fill-pipes are located outside of the building and should be so piped that the contents of the tank can be gauged. If the tanks are installed in the basement, an opening larger than the tank should be left in the concrete of the foundation wall and bricked in after the tank installation is complete.

A variation of this method is to use underground storage and a one-quart pump, completely housed for outside use and installed on a concrete island the same as a gasoline pump. The tops of the tank should be four feet below the surface of the ground in all cases where tanks are placed underground for the storage of lubricating oil, so that the flow of the oil will not be affected by the frost.

Another method is by means of cans. Pint, quart and two-quart bottles or cans are filled at the warehouse and delivered to the filling station in crates or trays which are similar to beer cases or milk trays. The attendant fills his trays direct from these containers. He is charged with so many bottles of a certain size and a specified grade of oil, and must either return the filled bottles or an equivalent in money.

This is an expensive method inasmuch as the oil has to be handled over several times and warrants slow service and the bottles or cans should also be cleaned every time they are used.

If tires or accessories or both are to be handled, it should be fully decided what class of stock and the quantity to be carried while the station is being planned.

Several stations in various parts of the country which started in with a complete line of accessories have discontinued their sale, the reason being that it actually reduces the gross sale of gasoline and lubricating oil.

It is a peculiar thing, but automobile drivers will not wait any great length of time at a filling station. They usually imagine that they are in a great hurry and as the stations are generally so plentiful they will drive on to the next one rather than to wait a few minutes.

Unquestionably fairly large profits can be made from a stock of accessories of the right class, and in some localities it would be impossible for a filling station to make money on the sale of gasoline and lubricating oil alone.

If possible an extra driveway should be constructed for cars desiring accessories, so that pumps will not be blocked by patrons leaving their cars to patronize this department.

Keep accessories in glass wall or window and cases. Do not have more than one show case, and that one not more than four or five feet in length. The opportunity for theft is far greater in a filling station than in the ordinary store.

Service Station and Repair Shop Appliances

The Auto Mechanic's Line of Shop Equipment

The Valve Facing Tool, the Adjustable Piston Vise, and the Adjustable Connecting Rod Alignment Machine, are three of the several items of shop equipment which are included in the Auto Mechanic's Tool Company's line, manufactured by this concern at Peoria, Ill.

The Adjustable Piston Vise retains the piston by means of four lugs. The size is 2½ x 4⅛ in., and can be accommodated by this tool. It is particularly useful in fitting piston rings, as the connecting rod can be dropped through a hole in the bench and carbon scraped from the piston head and rings fitted. It is also useful when tapping for set-screws to hold wrist pins or in cutting the cotter pins, drawing bushings from pistons, etc.

The valve faces and valve stems are trued up by the Valve Facing Tool. It is for determining whether a valve is true or not. No matter how slight the defect in the valve stem may be, the condition is immediately ascertained because, if the stem is twisted, it will not fit into the tool. The adjustable sleeve feature means that the cutting tool will be held true in revolving about the valve. A hollow ground cutter, made of good steel is used. Sleeves for the two standard valve stem sizes are used, ⅜ in. and 5-16 in. Oversize can be furnished at $.60 each and a 21-64 in. oversize for Fords can also be obtained. A 45 deg. cutter is standard, and a 30 deg. or other special cutters can be secured.

The Adjustable Connecting Rod Aligning Machine provides means for straightening and lining up the connecting rod. The piston pin and crankshaft pin are for the Ford connecting rod, although other special piston pins and bushings, for any make of crankshaft, can be furnished if desired. When the connecting rod is true, the points of the Aligner Pin Foot will touch on all sides of the disk.

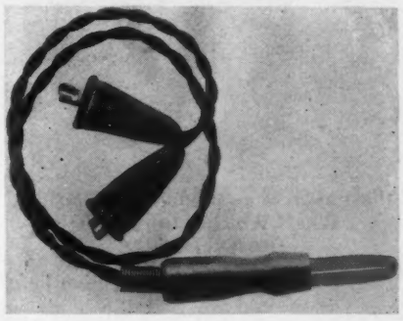
Another tool in the Auto Mechanic's line is the Valve Reseater. The feature of this is the adjustable collar which enables one to cut the seat in true relation with the valve guide. Cutters of this tool are adjustable to different sizes of valve seats, and can be obtained in either flat angle or oval type. This tool is small, compact and light, weighing but 1½ lb. Stems for the standard sizes, 5-16 in. and ⅜ in. are furnished with this tool. Special sizes can be furnished at $.75 each, including a wing nut, collar and set screw.

Tools for the Workshop

The illustration at the left shows the Auto Mechanic's Adjustable Piston Vise, which is stated not to mar the piston or spring the walls, when in use. Below is the Valve Facing Tool furnished with two sleeves of the standard valve stem sizes, and a 45 degree cutter. The illustration below at the left, shows the Adjustable Connecting Rod Alignment Machine, for straightening and lining up the connecting rod.

Electric Knife for Battery Service

As those experienced in battery repair know, the removal of sealing compound is by no means the simplest task encountered in renovating and repairing batteries. The compound is thick and tenacious and hard to cut with an ordinary knife. A new electrically operated appliance offered to the trade by the Service Station Supply Co., 30 E. Larned St., Detroit, Mich., is claimed to eliminate much of this difficulty and save an appreciable amount of time. This knife will remain red hot as long as the circuit is closed. It consists of a blade, handle, wire and connectors. In use the connectors are hooked to the poles on one cell of the battery. A narrow slit down the center of the blade enables the current to flow through the entire blade and heat it to the proper temperature.



Electrically-Heated Knife for Cutting Thick Compound Used in Batteries

The blade is securely fitted to a handle. Two wires that are attached to one end of the handle thread themselves through the handle to the blade. The wires are about 4 ft. long, protected by a spring where they leave the handle. At the other end of the wires two heavy, flexible connectors are provided. The price of this tool is $8.50.

Machine for Cutting Tires and Rims From Truck Wheels

A special machine, designed and sold by the Diamond Saw and Stamping Works, Buffalo, N. Y., for cutting solid tires and rims off of truck wheels is now being offered to the trade. This machine requires only two hp. and can be set up and used in ordinary garages as well as in large manufacturing plants.

This machine will cut tires and rims from truck wheels of any kind without injuring the hubs or spokes.

The arm on the machine that holds the blade is adjustable for different lengths, according to the width of the tires. It is, therefore, equipped with saw blades ranging from 17 in. up to 25 in. Experience has taught that the best re-

sults can be obtained if this machine is made to run at approximately 60 to 70 strokes per minute.

The operation of this machine is simple. The front wheel is rolled up to the large space and clamped against this.

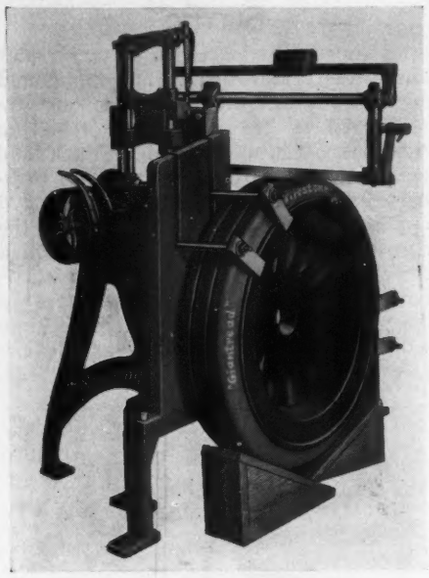


Illustration Shows Manner of Attaching Wheel Which is to Have Its Tire and Rim Cut

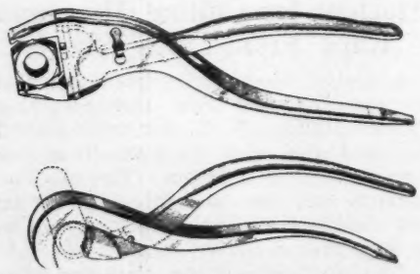
A stop is then set on the machine before the cut is started, so that the blade will pass through the depth required and not beyond, consequently, no damage can be done, even though the machine is allowed to run indefinitely.

It covers a floor space of 5½ ft. wide x 2 ft. 8 in. long and is 5½ ft. high. The net weight is 855 lb.

Two New Allen Tools

Two tools that will accommodate any size of pipe or nut, thereby eliminating the need of a line of various sized tools, is the product of the A. T. Allen Co., 6431 Eggleton Ave., Chicago, Ill. These tools are the drop forged Pipe Pliers and the Allen Tire Wrench.

The self-adjusting drop forged pliers may be used on any size of pipe by simply placing the hook jaw on the pipe and



These Two New Allen Tools, Pipe Pliers and Tire Wrench, Can Accommodate Various Sizes of Pipe or Nut

gripping the handle. It has a locking adjustment. The lock grip handle retains the proper position for gripping and very low pressure is required on account of the wedge grip. A slight release on the handle end gives a ratchet motion, releasing the tool.

The Plier Wrench will fit practically any size nut and retain the proper position of handle for grasping with the hand. The right handle lever locks the left jaw on the nut and as the relative proportion of leverage is so great the exertion of little pressure on the handles is sufficient to produce a powerful grip at the jaws. This tool will also give a ratchet motion similar to the pipe pliers. The price of the pipe pliers is $1.50 and the tire wrench $2.50.

Economy Tire Saw

The W. Robertson Machine & Foundry Co., 56 Rano St., Buffalo, N. Y., is manufacturing the Robertson Economy Tire Saw, No. 600, for cutting old tire rims from 30 to 40 in. This tool is used to cut the rims that support the rubber on truck tires. These tires, when new, are pressed on the wheel rim by hydraulic pressure and after use, rust and corrosion occurs between the wheel rim and the tire rim, uniting the metals to such an extent that their removal is difficult.

Worm Gearing Raises the Wheel to the Proper Height

This machine is to facilitate the cutting of the rim and has a special frame with a worm gearing employed to raise the wheel to the proper height. The machine is provided with a gage to stop cutting when the saw is through the rim. It cuts on the draw stroke and lifts the frame on the return by an oil compression lift pump. The blades are from 12 to 24 in. long. The net weight of the outfit is 590 lb. and the working floor space is 36 x 66 in. The pulley is 2½ x 12 in., and the pulley speed is 150 r.p.m. Overall height of the machine is 55 in.

Brown Introduces Molds and Steam Vulcanizers

Two new styles have been added to the Jesse F. Brown Mfg. Co.'s line of steam tube vulcanizers and tire shop repair equipment, namely, the Brown Dry Cure Retread Molds and the Brown 8-Clamp Steam Tube Vulcanizer Model 300. This company is located at 315 E. 33rd St., Los Angeles, Cal.

The boiler and steam chest of the Brown Dry Cure Retread Mold, is cast in one solid piece, making it a single unit. The rib thread is machined in a solid casting. Wood blocks are used for dead ends. The molds made of semi-steel are

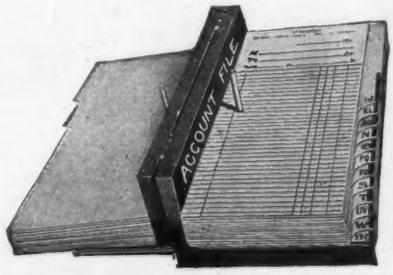
The Brown Dry Mixture Retread Mold

tested to 150 lb. Each mold is equipped with five clamps which are essential to produce the necesary pressure. Molds can be heated either by burner or steam. Each mold is furnished with a gas burner, steam gage, safety valve, overflow valve, funnel and water valve. The complete equipment includes all the necessary articles such as sand bags, clamps and a heavy steel band. The prices range, equipped with gas burner for generating its own steam, from $137.50 to $165, according to the size. Without the burner, the prices range from $132 to $159.50.

The 8-clamp steam tube vulcanizer, Model 300, is featured by a quick acting adjustable clamp designed to retain the tube in any position desired. The top of the plate which is 55 x 6 in. is machined finished. The boiler and plate are cast integral. This apparatus is furnished complete with a steam gage, safety gage, filler and filler valve. It retails at $1.00.

The Kitzmiller File

A new file for small accounts, has been brought out by Kitzmiller & Co., Unityville, Pa. This file is capable of holding



This File is Made of Hardwood

several hundred accounts and will last for years. It is 9 in. long and 5 in. wide and 5 in. high. The price of the file with 100 standard fillers printed to order is $7.50.

Replacement Table. Corrected Monthly

Including Piston Ring Sizes, Carburetor Sizes, Brake Lining Sizes and Truck Frame Dimensions

Note: Under Carburetor Inlet Diameter will be found either the size of the main air intake or the gasoline fuel line

Name, Model and Tonnage	ENGINE				BRAKE LINING								FRAME	
	Piston Rings		Carburetor		Service				Emergency				Length	Width
	No. per Cyl.	Diameter	Outer Diameter	Inlet Diameter	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Acason R.	4	1/4	1	.....	11 1/2	3	1/4	2	11 1/2	3	1/4	2	112	34
Acason RB.	4	1/4	1	.....	11 1/2	3 1/2	1/4	2	11 1/2	3 1/2	1/4	2	112	34
Acason H.	3	1/4	1 1/4	.....	13 1/2	3 1/2	1/4	2	13 1/2	3 1/2	1/4	2	130	35
Acason L.	3	1/4	1 1/4	.....	16	3 3/4	1/4	2	16	3 3/4	1/4	2	137	35
Acason M.	3	1/4	1 1/4	.....	18	4 1/2	1/4	2	18	4 1/2	1/4	2	167 1/2	35
Ace, Series A1 1/2	3	.....	1 1/4	3/8	12	3 1/4	1/4	4	12	3 1/4	1/4	4	122 1/2	32
Ace, Series A2 1/2	3	1/8	1 1/4	3/8	13 1/2	3 1/4	1/4	4	13 1/2	3 1/4	1/4	4	144 1/2	32
Acme B.	3	1/8	1 1/4	.....	12	3 1/4	1/4	4	12	3 1/4	1/4	4	110 3/8	34
Acme F.	3	1/8	1 1/4	.....	12	3 1/4	1/4	4	12	3 1/4	1/4	4	124 3/8	34
Acme A.	3	1/8	1 1/2	.....	14	3 1/2	1/4	4	14	3 1/2	1/4	4	135 1/2	34
Acme C.	3	1/8	1 1/2	.....	16	3 3/4	1/4	4	16	3 3/4	1/4	4	150 1/2	36
Acme E.	3	1/4	1 1/2	.....	18	4	1/4	4	18	4	1/4	4	160	37
All-American A.	3	1/8	1 1/4	1 11/16	42 1/2	2	1/8	1	39 11/16	2	1/8	1	104	31
Apex C.	3	1/8	1	1 1/4	42	2	....	1	41 1/2	2	....	1	102	35 1/2
Apex D.	3	1/8	1	1 1/4	42	2	....	1	41 1/2	2	....	1	102	35 1/2
Apex E.	3	1/4	1	1 1/4	54	2 1/4	....	1	53 1/4	2	....	1	128	31 1/2
Armleder KW 3 1/2	3	1/8	1 1/4	1/8	42	3	1/8	1	16	3 3/4	1/4	8	150	36
Armleder HW 2 1/2	3	1/8	1	1/8	13 1/4	3 1/2	1/4	4	13 1/4	3 1/2	1/4	4	140	30
Atterbury 7R.	3	1/4	1 1/4	3/8	13 1/16	3 1/2	1/4	4	13 1/16	3 1/2	1/4	4	115 3/16	34
Atterbury 7CX.	3	1/4	1 1/4	3/8	13 1/16	3 1/2	1/4	4	13 1/16	3 1/2	1/4	4	133 3/16	34
Atterbury 7D.	3	1/4	1 1/4	3/8	15 5/8	3 3/4	1/4	4	15 5/8	3 3/4	1/4	4	145 7/8	37 1/2
Atterbury 8E.	3	1/4	1 1/2	3/8	17 11/16	4	1/4	4	17 11/16	4	1/4	4	157 7/8	37 1/2
Autocar XXI-F	4	1/8	1 1/8	....	16 1/4	2 1/2	1/8	4	13	2 1/2	1/8	4	91	34
Available H2.	3	1/8	2 1/4	1 1/8	13 1/2	3 1/2	1/4	4	13 1/2	3 1/2	1/4	4	144	75 1/2
Available H2 1/2	3	1/8	2 1/4	1 1/8	13 1/4	3 1/2	1/4	4	13 1/2	3 1/2	1/4	4	144	75 1/2
Available H3.	3	1/8	2 1/2	1 1/8	16	3 3/4	1/4	4	16	3 3/4	1/4	4	168	85 1/4
Available H5.	3	1/4	2 1/2	1 1/8	16	4	1/4	4	16	4	1/4	4	168	89 7/8
Beck-Hawkeye A.	.....	.....	1 1/2	1 1/4	24	2	1/8	1	24	2	1/8	1	114	54
Beck-Hawkeye B.	.....	.....	1 1/2	1 1/4	24	2	1/8	1	24	2	1/8	1	114	66
Beck-Hawkeye C.	.....	.....	1 1/4	1 1/2	25	2 1/4	1/8	1	25	2 1/4	1/8	1	114	66
Beck-Hawkeye D.	3	1/8	1 3/4	1 1/2	25	2 1/4	1/8	1	25	2 1/4	1/8	1	136	72
Belmont A.	.....	.....	1	1 1/2	32	2	1/8	2	31	1 1/2	1/8	2	78	34
Belmont B.	.....	.....	1	1 1/2	41	2	1/4	2	40	1 1/2	1/4	2	120	36
Belmont C.	.....	.....	1	1 3/4	41	2 1/2	1/4	2	40	2	1/4	2	124	36
Bessemer G.	.....	.....	1	1/8	47 1/2	2 1/2	1/8	2	45 1/2	2 1/4	1/8	2	98	34
Bessemer H2.	.....	.....	1	1/8	56 1/2	2 1/2	1/8	2	55	2 1/4	1/8	2	116	34
Bessemer J2.	.....	.....	1 1/4	1/8	56 1/2	2 1/2	1/4	2	55	2 1/4	1/8	2	141	34
Bessemer K2.	.....	.....	1 1/4	1/8	58 1/2	3 1/2	1/8	2	30 1/4	4 1/2	1/8	1	157 1/2	38
Bethlehem D.	3	1/4	1	1/4	43	2 1/2	1/8	2	40 1/8	1 3/4	1/8	2	120	34
Bethlehem E.	3	1/4	1	1/4	51	3	1/8	2	49	2	1/8	2	138	34
Bethlehem F.	4	1/4	1	1/4	55	3	1/8	2	50	2	1/8	2	156	34
Brinton F.	3	1/8	1 1/16	3/4	13	3 1/2	1/4	8	13	3 1/2	1/4	8	135 1/2	33
Briscoe T34	3	....	1	1 1/4	39	1 3/4	1/8	2	43 11/16	2 1/2	1/8	2	98 1/2	34
Brockway S.	3	1/8	1	.....	20	2	1/8	4	20	2	1/8	4	118	32
Brockway K.	3	1/8	1 1/4	.....	12	3 3/16	1/8	4	12	3 3/16	1/8	4	142	34
BrockwayR.	3	1/8	1 1/4	.....	15 5/16	3 3/4	1/8	4	15 5/16	3 3/4	1/8	4	176	36
Brockway T.	3	1/4	1 1/4	.....	18	4	1/8	4	18	4	1/8	4	176	36
Chicago C1.	.....	.....	1	.....	12 1/8	3 1/4	1/4	4	12 1/8	3 1/4	1/4	4	111	32

Name, Model and Tonnage	ENGINE				BRAKE LINING								FRAME	
	Piston Rings		Carburetor		Service				Emergency				Length	Width
	No. per Cyl.	Diameter	Outlet Diameter	Inlet Diameter	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Chicago C1 1/2.	.....	.....	1	.....	12 1/8	3 1/4	1/4	4	12 1/8	3 1/4	1/4	4	125	32
Chicago C2 1/2.	.....	.....	1 1/4	.....	13 3/4	3 1/2	1/4	4	13 3/4	3 1/2	1/4	4	135	32
Chicago C3 1/2.	.....	.....	1 1/4	.....	16	3 3/4	1/4	4	16	3 3/4	1/4	4	180	36 3/4
Clydesdale 120B.	3	1/4	1 11/16	1/8	18	4	1/4	4	18	4	1/4	4	207	38
Clydesdale 90.	3	1/8	1 5/8	1/8	16	3 3/4	1/4	4	16	3 3/4	1/4	4	166 1/2	38
Clydesdale 65X.	3	1/8	1 1/8	1/8	13 1/4	3 1/2	1/4	4	13 1/4	3 1/2	1/4	4	137	33 1/4
Clydesdale 42.	3	1/8	1 1/8	1/8	12	3 1/4	1/4	4	12	3 1/4	1/4	4	117 1/2	34
Clydesdale 32X.	3	1/8	1 1/8	1/8	20	1 3/4	1/4	4	20	1 3/4	1/4	4	117 1/2	34
Columbia G.	.....	.....	1 1/4	....	55	3	1/8	2	50	2	1/8	2	132	32 1/2
Columbia F.	3	1/8	1	....	39 1/4	2 1/2	1/8	2	40 1/2	1 3/4	1/8	2	108	32 1/2
Comet.	4	1/8	1	1	17 1/4	2 1/4	1/8	2	17 1/4	1 1/2	1/8	2	100	36
Commerce E 1, 1 1/2.	3	1/8	1	1/8	45	2 1/2	1/8	2	43	2 1/4	1/8	2	92	34
Commerce EP 1 1/2, 2.	3	1/8	1	1/8	45	2 1/2	1/8	2	43	2 1/4	1/8	2	100	34
Concord A.	.....	.....	1 1/4	1/8	13 1/2	3 1/2	1/4	4	13 1/2	3 1/2	1/4	4	110 1/4	32 1/16
Concord B.	.....	.....	1 1/4	1/8	13 1/2	3 1/2	1/4	4	13 1/2	3 1/2	1/4	4	124 5/8	32 1/16
Conestoga 12.	.....	.....	1	1/8	39	2	1/8	1	39	2	1/8	1	86	34
Conestoga 20.	3	1/8	1	1/8	22	2 1/2	1/8	2	14	2 1/2	1/8	2	96	32
Conestoga 30.	3	1/8	1	1/8	22	2 1/2	1/8	2	14	2 1/2	1/8	2	120	32
Corbitt E.	3	1/8	1	1/8	19	2	1/8	2	19	2	1/8	2	105	34
Corbitt D.	3	1/8	1 1/4	1/8	45 1/4	2	1/4	1	35 1/4	2	1/4	1	120	34
Corbitt C.	3	1/8	1 1/4	1/8	51 1/2	2 1/4	1/4	1	51 1/2	2 1/4	1/4	1	138	35
Corbitt B.	3	1/8	1 1/4	1/8	51 1/2	2 1/4	1/4	1	51 1/2	2 1/4	1/4	1	138	35
Corbitt AA.	3	1/4	1 1/2	1/8	69 1/4	3	1/4	1	69 1/4	3	1/4	1	160	38
Corbitt A.	3	1/8	1 1/4	1/8	64	2 1/2	1/4	1	64	2 1/2	1/4	1	160	35
Couple Gear HC, AC, LO.	.....	.....	2	1 3/4	48	3	1/4	2	.....	.....	.....	.....	168	42
Dart H.	3	1/4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	102	34
Dart S.	3	1/4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	112	34
Dart M.	3	1/4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	124	34
Dart W.	3	1/4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	144	38
Day-Elder A.	3	1/8	1 11/16	1 1/8	47	2 1/2	1/8	1	33 1/2	2 1/2	1/8	1	103	35
Day-Elder B.	3	1/8	1 11/16	1 1/8	47	2 1/2	1/8	1	33 1/2	2 1/2	1/8	1	120	35
Day-Elder D.	3	1/8	1 11/16	1 1/8	48	2 1/2	1/8	1	33	2 1/2	1/8	1	151 3/4	35
Day-Elder C.	3	1/4	1 11/16	1 1/8	57	2 1/2	1/8	1	43	2 1/2	1/8	1	151 1/4	35
Day-Elder F.	3	1/8	1 11/16	2	57	2 1/2	1/8	1	43	2 1/2	1/8	1	145	37
Day-Elder E.	3	1/4	1 11/16	2	68	3	1/4	4	68	3	1/4	4	155	37
Dearborn BW.	3	.....	1	.....	16 1/2	2 1/2	1/8	2	16 1/2	1 1/2	1/8	2	112	32
Dearborn F.	3	1/4	1	.....	16 1/2	2 1/2	1/8	2	16 1/2	1 1/2	1/8	2	93	36
Dearborn C.	.....	.....	3/4	.....	38	2	1/8	1	38	2	1/8	1	107	32
Defiance B.	3	1/8	1	.....	45	2 1/2	1/8	1	43 1/8	2 1/4	1/8	1	116	34
Defiance C.	3	1/8	1	.....	54 1/16	2 1/2	1/8	1	52 1/2	2 1/4	1/8	1	116	34
De Kalb E2.	3	1/8	1 1/4	1 1/4	28	3 1/2	1/8	1	28	3 1/2	1/8	1	120	30
De Kalb E2 1/2.	3	1/8	1 1/4	1 1/4	28	3 1/2	1/8	1	28	3 1/2	1/8	1	132	32
Denby 12.	3	1/8	1	.....	43 1/2	2 1/2	1/8	1	39 1/2	1 3/4	1/8	1	95	34
Denby 134.	3	1/8	1	.....	51 1/4	2 1/2	1/8	1	47	2	1/8	1	129	34
Denby 25.	3	1/8	1 1/4	.....	55 3/4	3	1/8	1	51	2	1/8	1	142	34
Denby 27.	3	1/8	1 1/4	.....	61 1/2	3	1/8	1	58	2 1/2	1/8	1	186	34
Denby 210.	3	1/8	1 1/4	.....	89	2 1/4	1/8	1	89	2 1/4	1/8	1	186	34
Dependable C.	.....	.....	.....	.....	53 1/2	2 1/2	1/8	1	39 1/4	2 1/2	1/8	1	121	33

Replacement Table—Continued

Name, Model and Tonnage	ENGINE				BRAKE LINING								FRAME	
	Piston Rings		Carburetor		Service				Emergency				Length	Width
	No. per cyl.	Diameter	Outlet Diameter	Inlet Diameter	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Dependable E					62 1/8	2 1/2	1/4	1	48	2 1/2	1/4	1	152	33
Diamond T-J5	3	1/4	1	1 1/4	12 1/2	3 1/4	1/4	8	12 1/2	3 1/4	1/4	8	97 1/4	34
Diamond T-J4	3	1/4	1	1 1/4	13 1/4	3 1/2	1/4	8	13 1/4	3 1/2	1/4	8	128 1/4	34
Diamond T-J3	3	1/4	1 1/4	1 1/2	13 1/4	3 1/2	1/4	8	13 1/4	3 1/2	1/4	8	129 1/2	34
Diamond T-LB	3	1/4	1 1/4	1 1/2	16	3 3/4	1/4	8	16	3 3/4	1/4	8	142 1/2	37
Diamond T-R	3	1/4	1 1/4	1 1/2	18 1/2	4	1/4	8	18 1/2	4	1/4	8	154 1/2	37
Diamond T-S	3	1/4	1 1/4	1 1/4	18 1/2	4	1/4	8	18 1/2	4	1/4	8	156 3/8	37
Diamond T-FS&T	3	1/4	1	1 1/4	13 1/4	3 1/2	1/4	8	13 1/4	3 1/2	1/4	8	123 1/4	34
Diehl A	3		1	1	28	2 1/2	1/4	2	27	2	1/4	2	90	
Doane 2½	3	1/4	1 1/4	1/4	34 1/2	3	1/4	2	34	3	1/4	4	126	53
Doane 6	3		1 1/2	1/4	37 1/2	3	1/4	2	46	4	1/4	2	168	64
Dodge	3	1/4	1	1/4	19 1/4	2 1/2	1/4	2	14 3/4	1 3/4	1/4	2	47 3/8	38
Dorris K4	3	1/4	1 1/4	1 1/4	13 1/2	3 1/2	1/4	4	13 1/2	3 1/2	1/4	2	142 3/4	34
Dorris K7	3	1/4	1 1/4	1 1/4	15 3/4	3 3/4	1/4	4	15 3/4	3 3/4	1/4	2	149 1/2	36
Douglas 1			1 1/4	1/4	3	2	1/4	2	42	2	1/4	2	101	31 1/2
Douglas 1½			1 1/4	1/4	3	2	1/4	2	42	2	1/4	2	117	31 1/2
Douglas 2½			1 1/4	1/4	4	2 1/2	1/4	2	54	2 1/2	1/4	2	133	31 1/2
Duplex E	3	1/4	1 1/4	1	9 1/2	2 1/2	1/4	2	5 1/2	2 1/2	1/4	2	126	39 3/8
Ellsworth 25A	3	1/4	1 1/4	1 1/4	12	1 1/4	1/4	4	12	1 1/4	1/4	4	Opt	36
Evans 2	3	1/4	1 1/4	1/4	54	2 1/2	3/8	2	51	2 1/2	3/8	2	120 1/4	34
Fageol 1½			1 1/4	1 1/2	19 1/4	1 3/4	1/4	2	19 1/4	1 3/4	1/4	2	120	30
Fageol 2½	3	1/4	1 1/4	1 1/4	13 1/4	3 1/2	1/4	2	13 1/4	3 1/4	1/4	2	135	34
Fageol 4500	3	1/4	1 5/8	2	15 1/2	3 3/4	1/4	2	15 1/2	3 3/4	1/4	2	161 1/4	37 3/4
Fageol 5300	3	1/4	1 5/8	2	18	4	1/4	2	18	4	1/4	2	161 1/4	37 3/4
Famous B10	3	1/4	1	1/4	21	2 3/4	1/4	1	48	2	1/4	2	94	34
Famous B12	3	1/4	1	1/4	21	2 1/2	1/4	1	48	2	1/4	2	94	34
Fargo O17	3	1/4		1 1/2	52	3	1/4	2	50 1/2	2	1/4	2	132	33
Fargo P18	3	1/4		1 1/2	52	3	1/4	2	50 1/2	2	1/4	2	132	33
Fargo P19	3	1/4		1 1/2	52	3	1/4	2	50 1/2	2	1/4	2	132	33
Fargo P20	3	1/4		1 1/2	52	3	1/4	2	50 1/2	2	1/4	2	132	33
Federal SD	3	1/4	1	1 1/4	10 11/16	3	1/4	4	10 11/16	3	1/4	4	112	34
Federal TE	3	1/4	1 1/4	1 1/2	13 1/4	3 1/2	1/4	4	13 1/4	3 1/2	1/4	4	120	34
Federal UE	3	1/4	1 1/4	1 1/2	13 1/4	3 1/4	1/4	4	13 1/4	3 1/2	1/4	4	136	34
Federal WD	3	1/4	1 1/4	1 1/2	15 5/8	3 3/4	1/4	4	15 5/8	3 3/4	1/4	4	156	38
Federal XC	3	1/4	1 1/4	1 1/2	17 11/16	4	1/4	4	17 11/16	4	1/4	4	156	38
Federal Light Duty	3	1/4	1 1/4	1 1/2	13 1/4	3 1/2	1/4	4	13 1/4	3 1/2	1/4	4	88	34
Federal Heavy Duty	3	1/4	1 1/4	1 1/2	15 5/8	3 3/4	1/4	4	15 5/8	3 3/4	1/4	4	84	38
Ford T	3	1/4	1 1/8	1 1/4	23 3/8	1 1/16	11/16	1	12	1 1/8	1/4	2	123 11/16	32
F.W.D. B	3	1/4	1	1/4	27	3 1/2	1/4	4	43	2 3/4	1/4	4	136	36
Gabriel E	3	1/4	2 1/4	1 3/4	....	3 1/4	1/4	4	13	3 1/4	1/4	4	144	33
Gabriel F			2 1/2	1 3/4	....	3 3/4	1/4	4	16	3 3/4	1/4	4	144	37
Garford 25	3	1/4	1	....	11 3/4	3 1/4	1/4	4	11 3/4	3 1/4	1/4	4	103	34
Garford 70B	3	1/4	1 1/4	....	13 1/4	3 1/2	1/4	4	13 1/4	3 1/2	1/4	4	121	34
Garford 77D	3	1/4	1 1/4	....	15 5/8	3 3/4	1/4	4	15 5/8	3 3/4	1/4	4	144	36
Garford 77C	3	1/4	1 1/4	....	15 5/8	3 3/4	1/4	4	15 5/8	3 3/4	1/4	4	150	32
Garford 68	3	1/4	1 1/4	....	10 1/2	4	3/8	2	21 5/8	4	1/4	4	150	32
Gary F	3	1/4	1 1/4	3/8	22 1/2	3	1/4	2	22 1/2	3	1/4	2	114	34
Gary GT	3	1/4	1 1/2	3/8	24	3 1/4	1/4	2	24	3 1/4	1/4	2	120	34
Gary J	3	1/4	1 1/2	3/8	27	3 1/2	1/4	2	27	3 1/2	1/4	2	120	34
Gary KT	3	1/4	1 1/2	3/8	32	3 1/4	1/4	2	32	3 1/4	1/4	2	148	36 3/4
Gary M			1 3/4	3/8	36 1/2	4	1/4	2	36 1/2	4	1/4	2	168	39
Gersix K	3	1/4	1 1/4	1 1/2	20	2 1/2	1/4	4	47	2 1/4	1/4	2	131	34
Gersix M	3	1/4	1 1/4	1 1/2	46	2	1/4	2	46	2	1/4	2	114	32
Giant 14	3	1/4	1	....	19	2	1/4	4	19	2	1/4	4	116 1/2	33
Giant 15	3	1/4	1	....	19	2	1/4	4	19	2	1/4	4	116 1/2	32
Giant 16	3	1/4	1 1/4	....	45 1/2	2	1/4	2	45 1/2	2	1/4	2	140 1/2	33
Giant 17	3	1/4	1 1/2	....	56 1/2	2 1/2	1/4	2	46 1/2	2 1/2	1/4	2	183 1/2	36
G.M.C. 16	3	1/4	1	1	40 11/16	1 7/8	1/4	2	43 1/4	1 7/8	1/4	2	92 1/2	34
G.M.C. 31A	3	1/4	1	1	13 1/4	3 1/2	1/4	4	13 1/4	3 1/2	1/4	4	101	33
G.M.C. 31B	3	1/4	1	1	13 1/4	3 1/2	1/4	4	13 1/4	3 1/2	1/4	4	125	33
G.M.C. 41A	3	1/4	1	1	13 1/4	3 1/2	1/4	4	13 1/4	3 1/2	1/4	4	125 3/8	33
G.M.C. 41B	3	1/4	1	1	13 1/4	3 1/2	1/4	4	13 1/4	3 1/2	1/4	4	149 3/4	33
G.M.C. 71A	3	1/4	1 1/4	1 1/4	15 5/8	3 3/4	1/4	4	15 5/8	3 3/4	1/4	4	144	38
G.M.C. 71B	3	1/4	1 1/4	1 1/4	15 5/8	3 3/4	1/4	4	15 5/8	3 3/4	1/4	4	192	38
G.M.C. 101A	3	1/4	1 1/4	1 1/4	17 11/16	4	1/4	4	17 11/16	4	1/4	4	144	38
G.M.C. 101B	3	1/4	1 1/4	1 1/4	17 11/16	4	1/4	4	17 11/16	4	1/4	4	192	38
Gramm-Bernstein 15	3	1/4	1	....	50	2	....	1	50	2	....	1	120	32

Name, Model and Tonnage	ENGINE				BRAKE LINING								FRAME	
	Piston Rings		Carburetor		Service				Emergency				Length	Width
	No. per cyl.	Diameter	Outlet Diameter	Inlet Diameter	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Gramm-Bernstein 65	3	1/4	1	....	49	1 3/4	....	1	49	1 3/4	....	1	120	32
Gramm-Bernstein 20	3	1/4	1 1/4	....	50	2	....	1	50	2	....	1	126	32 1/8
Gramm-Bernstein 25	3	1/4	1 1/4	....	56 1/2	3 1/2	....	1	....	....	....	1	132	36
Gramm-Bernstein 35	3	1/4	1 1/4	....	66	2 3/4	....	1	66	2 3/4	....	1	144	36
Gramm-Bernstein 50	3	1/4	1 1/2	....	75 1/2	3 3/4	....	1	75 1/2	2 3/4	....	1	162	36
Grant 10	3	1/4	1 1/8	....	45	2 1/2	1/4	2	43 1/8	2 1/4	1/4	2	107	35 1/8
Grant 11	3	1/4	1 1/8	....	45	2 1/2	1/4	2	43 1/8	2 1/4	1/4	2	134 1/2	35 1/8
Grant 15	3	1/4	1 1/8	....	54 1/8	2 1/2	1/4	2	52 1/8	2 1/4	1/4	2	107	35 1/8
Grant 16	3	1/4	1 1/8	....	54 1/8	2 1/2	1/4	2	52 1/8	2 1/4	1/4	2	134 1/4	35 1/8
Hall 2-Worm					13 1/2	3 1/2	1/4	2	13 1/2	3 1/2	1/4	2	144	38
Hall 3½-Worm	3	1/4			16	3 3/4	1/4	2	16	3 3/4	1/4	2	180	39
Hall 5-Worm					18 1/2	4	1/4	2	18 1/2	4	1/4	2	144	39
Hall 5-7-Chain					37	2 1/2	1/4	1	59	4	1/4	1	180	39
Harvey WEA	4	1/4			46	2	1/4	2	46	2	1/4	2	120	32
Harvey WFA	4	1/4			52	2 1/4	1/4	2	52	2 1/4	1/4	2	126 1/2	32
Harvey WHA	4	1/4			56	2 1/2	1/4	2	56	2 1/2	1/4	2	144	35
Harvey WKA	4	1/4			69	3	1/4	2	69	3	1/4	2	144	35
Hawkeye K			1 1/4		48	2	1/4	2	47	1 1/2	1/4	2	112	34
Hawkeye M			1 1/4		54	2 1/2	1/4	2	52	2	1/4	2	112	34
Hendrickson I	3	1/4	1 1/4	1/4	12	3 1/2	1/4	4	12	3 1/2	1/4	4	Opt	32 1/2
Hendrickson J	3	1/4	1 1/4	1/4	16	3 3/4	1/4	4	16	3 3/4	1/4	4	Opt	36
Hendrickson K	3	1/4	1 1/2	1/4	18	4	1/4	4	18	4	1/4	4	Opt	38
Highway-Knight A			1 1/2		57	2 1/2	1/4	1	57	2 1/2	1/4	1	150	38
Highway-Knight B			1 1/2		69	3	1/4	1	69	3	1/4	1	150	38
Higrade A18			1	1	12	1 1/2	1/4	2	12	1 1/2	1/4	2	85	32
Higrade B20			1 1/8	1 1/8	18	2	1 1/4	2	18	2	1 1/4	2	102	32
Hood C	3	1/4	1	1/4	23	1	1/4	1	23	2 1/2	1/4	2	30	23
Hoover 15B	3	1/4	1	1 3/4	16	1 3/4	1/4	2	16	1 3/4	1/4	2	82	35 1/2
Hoover 20A	3	1/4	1	1 3/4	19	2	1/4	2	19	2	1/4	2	105	33
Huffman B	3	1/4	1	1/4	44	2 1/4	1/8	2	44	1 1/2	1/8	2	123	32
Huffman C	3	1/4	1	1/4	46	2 1/2	1/8	2	44	2 1/4	1/8	2	123	32
Hurlburt A1½-2	3		1 1/4	1	22	2	1/4	2	22	2	1/4	2	132	35 1/2
Hurlburt B2½	3	1/4	1 1/4	1	24	2 1/2	1/4	2	23	2 1/2	1/4	2	154	34
Hurlburt C3½-4	3	1/4	1 1/2	1 1/4	26	3	1/4	2	25	3	1/4	2	144 1/2	34
Hurlburt D5-5½	3	1/4	1 1/2	1 1/4	28	3	1/4	2	27	3	1/4	2	144 1/2	34
Indiana 12	3	1/4	1	....	17 1/2	2	1/4	8	17 1/2	2	1/4	8	108	32
Indiana 20	3	1/4	1 1/4	....	44	2	1/4	4	44	2	1/4	4	126	33
Indiana 25	3	1/4	1 1/4	....	51	2 1/4	1/4	4	51	2 1/4	1/4	4	138	33
Indiana 35	3	1/4	1 1/4	....	56	2 1/4	1/4	4	56	2 1/2	1/4	4	144	34 1/2
Indiana 50	3	1/4	1 1/4	....	68	3	1/4	4	68	3	1/4	4	156	37 1/2
International H	3	1/4	1.7	1 1/4	43 3/4	2 1/4	1/4	2	43 3/4	2 1/4	1/4	2	67 7/8	34
International F	3	1/4	1.7	1 1/4	43 3/4	2 1/4	1/4	2	43 3/4	2 1/4	1/4	2	88 3/4	34
International K	3	1/4	1.7	1 1/4	50 5/8	2 1/4	1/4	2	50 5/8	2 1/4	1/4	2	92 11/16	34
International G	4	1/4	1.7	1 1/4	50 5/8	2 1/4	1/4	2	50 5/8	2 1/4	1/4	2	99 3/8	34
International L	4	1/4	1.7	1 1/4	74 11/16	2 1/2	1/4	2	74 11/16	2 1/2	1/4	2	169	34
Jones 31A	3	1/4	1	1/4	41 11/16	2 1/2	1/4	2	39 1/4	1 3/4	1/4	2	100 1/2	36
Jumbo O	3	1/4	1 1/4	....	51 1/4	3	1/4	1	48 3/4	2 1/2	1/4	1	116	34
Jumbo E	3	1/4	1 1/4	....	51 1/4	3	1/4	1	48 3/4	2 1/2	1/4	1	159	34
Jumbo C	3	1/4	1 1/4	....	51 1/4	3	1/4	1	48 3/4	2 1/2	1/4	1	72	34
Kalamazoo G	3	1/4	1 1/8	....	50	2 1/2	1/4	1	....	2 1/2	1/4	1	126	32 1/2
Kalamazoo H	3	1/4	2 1/8	....	90	2 1/2	1/4	1	48	2 1/2	1/4	1	148	33
Kalamazoo K	3	1/4	2 1/8	....	60	2 1/2	1/4	1	60	2 1/2	1/4	1	151	36
Kankankee E	3	1/4	1 1/8	1 1/4	51	3	1/4	2	50	2	1/4	2	148	32
Keldon 19	4	1/4	1 1/4	1 1/4	48	3	1/4	1	45	3	1/4	1	132	34
Kelly-Springfield K31	3	1/4	1	1/4	16 3/4	1 7/8	1/4	4	16 3/4	1 7/8	1/4	4	141	34
Kelly-Springfield K32	3	1/4	1	1/4	17 3/8	1 7/8	1/4	4	17 3/8	1 7/8	1/4	4	141	34
Kelly-Springfield K35	3	1/4	1	1/4	16 3/4	1 7/8	1/4	4	16 3/4	1 7/8	1/4	4	141	34
Kelly-Springfield K36	3	1/4	1	1/4	17 3/8	1 7/8	1/4	4	17 3/8	1 7/8	1/4	4	141	34
Kelly-Springfield K40	3	1/4	1 1/2	1/4	21	2 7/8	1/4	4	21	2 3/8	1/4	4	145	38
Kelly-Springfield K45	3	1/4	1 1/2	1/4	21	2 7/8	1/4	4	21	2 3/8	1/4	4	145	38
Kelly-Springfield K50	3	1/4	1 1/2	1/4	21	2 7/8	1/4	4	21	2 3/8	1/4	4	145	38
Kelly-Springfield K60	3	1/4	1 1/2	1/4	21	2 7/8	1/4	4	21	2 3/8	1/4	4	145	83
Keystone 40			1		50 1/2	3	1/4	1	46 3/4	2	1/4	1	124	33
Kimball			1 1/4		50	2 1/4	1/4	4	33	3 1/2	1/4	....	135	34
Kimball			1 1/4		52	2 1/2	1/4	4	33	3 1/2	1/4	....	152	34
Kimball			1 1/2		52	2 1/2	1/4	4	33	3 1/2	1/4	....	152	34
Kimball			1 1/2		58	3	1/4	2	58	3	1/4	....	171	36

Name, Model and Tonnage	ENGINE				BRAKE LINING								FRAME	
	Piston Rings		Carburetor		Service				Emergency				Length	Width
	No. per cyl.	Diameter	Outlet Diameter	Inlet Diameter	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Kimball	...	...	1½	...	65	3	¼	2	65	3	¼	...	171	36
King-Zeitler 1½	3	⅛	1	1¼	48	3¼	¼	4	48	3¼	¼	4	Opt	32
King-Zeitler 2	3	⅛	1	1¼	54	3½	¼	4	54	3½	¼	4	Opt	32
King-Zeitler 3½	3	⅛	1	1¼	63	3¾	¼	4	63	3¾	¼	4	Opt	36
Kissel-Delivery	3	⅛	.....	1¼	44¼	2	⅛	2	44¼	2	⅛	2	96	33½
Kissel-Utility	3	⅛	.....	1¼	19	2	⅛	4	19	2	⅛	4	120	34
Kissel-Freighter	3	⅛	.....	1¼	13½	3½	¼	4	13½	3½	¼	4	144	34
Kissel-Heavy-Duty	3	⅛	.....	1¼	56	2½	⅛	2	56	2½	⅛	2	156	36
Kissel-Goliath	3	⅛	.....	1¼	56	2½	⅛	2	56	2½	⅛	2	168	36
Kleiber 1	...	...	1¼	1¼	...	...	...	...	...	...	...	...	120	34
Kleiber 1½	...	...	1¼	1¼	...	...	...	...	...	...	...	...	132	34
Kleiber 2	...	...	1¼	1¼	...	...	...	...	...	...	...	...	144	34
Kleiber 2½	...	...	1¼	1¼	...	...	...	...	...	...	...	...	150	34
Kleiber 3½	...	...	1¼	1¼	...	...	...	...	...	...	...	...	156	34
Kleiber 5	...	...	1½	1¼	...	...	...	...	...	...	...	...	168	38
Knox 35	4	¼	1½	...	...	4	...	2	57⅜	6½	¼	1	27 ⅛	28
Knox 36	4	¼	1½	...	...	4	...	3	57¾	6½	¼	1	96 ⅞	28
Koehler M 2½	4	⅛	1¼	⅛	13½	3½	¼	4	13½	3½	¼	4	144	34
Koehler C 1¼	3	⅛	1	¼	47	2½	⅛	2	46	2¼	⅛	2	108	34
Lange	3	...	...	...	30	2	¼	2	18	3	¼	4	114	37
Larrabee-Deyo U	3	⅛	1¼	...	48	2	¼	2	48	2	¼	2	108	34
Larrabee-Deyo A & B	3	⅛	1¼	...	60	2½	¼	2	60	2½	¼	2	132	36
Larrabee-Deyo C & D	3	⅛	1¼	...	54	2¼	¼	2	54	2¼	¼	2	132	36
Larrabee-Deyo T	3	⅛	1¼	...	72	3	¼	2	72	3	¼	2	162	36
Lombard	...	...	...	...	...	...	...	...	...	...	...	...	120	32
Luedinghaus	...	...	1¼	1⅛	40	2¼	¼	2	40	1½	¼	2	120	34
Luverne BBL	3	⅛	1¼	1¼	....	2½	¼	2	....	2½	¼	2	108	34
Maccar L	3	⅛	1¼	⅜	48	3¼	¼	4	48	3½	¼	4	128¼	34
Maccar H	3	⅛	1¼	⅜	52	3½	¼	4	52	3½	¼	4	143¾	34
Maccar M	3	⅛	1¼	⅜	64	3¾	¼	4	64	3¾	¼	4	157¾	34
Maccar G	3	¼	1½	⅜	72	4	¼	4	72	4	¼	4	166 ⅝	37½
Mack AB 1½, 2 Ton-Chain	3	4	1¼	¼	12¼	4	¼	2	16½	2½	¼	4	Opt	33¼
Mack AB 1½, 2 Ton-Worm	3	4	1¼	¼	13⅛	3½	¼	4	13⅛	3½	¼	4	Opt	33¼
Mack AB-Tractor 5 Ton	3	4	1¼	¼	12¼	4	¼	2	16½	2½	¼	4	77	33¼
Mack AC 3½, 5, 6½, 7½ Ton	4	5	1½	¼	16⅛	3	¼	4	20½	3½	¼	4	Opt	37½
Mack AC Tractor 7, 10, 13, 15Ton	4	5	1½	¼	16⅛	3	¼	4	20½	3½	¼	4	87	37½
Master JI	3	⅛	1¼	2	74½	2½	⅛	1	74½	2¼	¼	1	120	34
Master JW	3	⅛	1¼	2	12	3¼	¼	2	12	3¼	¼	2	120	34
Master M	3	¼	1¼	2	74½	2½	⅛	1	74½	2¼	¼	1	120	34
Master O	3	¼	1¼	2	74½	2½	⅛	1	74½	2¼	¼	1	159	34
Master W	3	¼	1¼	2	13¼	3½	¼	2	13¼	3½	¼	2	120	34
Master WL	3	¼	1¼	2	13¼	3½	¼	2	13¼	3½	¼	2	159	34
Master T	3	¼	1¼	2	74½	2½	⅛	1	74½	2¼	¼	1	74¼	34
Master A	4	¼	1½	1¾	16	3¾	¼	2	16	3¾	¼	2	150	36¼
Master AL	4	¼	1½	1¾	16	3¾	¼	2	16	3¾	¼	2	186	36¼
Master B	4	¼	1½	1¾	18	4	¼	2	18	4	¼	2	168	39
Master BL	4	¼	1½	1¾	18	4	¼	2	18	4	¼	2	192	39
Maxwell 1¼	3	⅛	1	1	16	1¾	⅛	2	16	1¾	⅛	2	102	36 ⅛
Menominee HT	3	⅛	1	1½	12	3¼	¼	8	...	...	...	...	.....	32
Menominee H	3	⅛	1¼	1¾	13½	3½	¼	8	...	...	...	...	.....	32
Menominee D	3	⅛	1¼	1¾	13½	3½	¼	8	...	...	...	...	.....	32
Menominee G	3	¼	1½	2	16	3½	¼	8	...	...	...	...	.....	36
Menominee J	3	⅛	1½	2	18½	4	¼	8	...	...	...	...	.....	38
Moreland 19B	3	⅛	1¼	1¾	12	3½	¼	4	12	3½	¼	4	132	34
Moreland 19C	3	⅛	1½	1¾	13½	3½	¼	4	13½	3½	¼	4	156	34
Moreland 19G	3	¼	1½	1¾	16	3¾	¼	4	16	3¾	¼	4	168	38
Moreland 19J	3	¼	1½	1¾	18	4	¼	4	18	4	¼	4	168	38
Muskegon 20	3	⅛	1¼	2	54	2½	⅛	2	53	2¼	¼	2	119½	34
Mutual	...	...	...	1¼	52	2¼	¼	2	52	2¼	¼	2	129⅜	34
Myers 60	3	⅛	1½	1½	44	2	2¼	2	44	2	2¼	2	102	34
Myers 80	3	⅛	1½	1½	44	2	2¼	2	44	2	2¼	2	112	34
Napoleon 9	3	¼	1	⅛	44	2	⅛	1	30	2½	⅛	1	102	35
Napoleon 11	3	¼	1	⅛	49	2	⅛	1	30	2½	⅛	1	102	35
Nash 2018	4	¼	1¼	1¼	49 1/6	2	⅛	2	20 ⅛	2½	⅛	1	104½	30½
Nash 3018	4	¼	1¼	1¼	50 5/6	3	⅛	2	20 ⅛	2½	⅛	1	118¾	31 ⅝
Nash 4017	3	¼	1¼	1¼	49¼	2½	¼	4	25 ⅛	2½	¼	1	117⅛	38⅛
Nelson & LeMoon F1	3	⅛	1¼	⅛	12	3¼	¼	2	12	3¼	¼	2	Opt	.....
Nelson & LeMoon F1½	3	⅛	1¼	⅛	12	3¼	¼	2	12	3¼	¼	2	Opt	.....
Nelson & LeMoon F2	3	⅛	1¼	⅛	12	3¼	¼	2	12	3¼	¼	2	Opt	.....
Nelson & LeMoon F3½	3	¼	1¼	⅛	16½	3¾	¼	2	16½	3¾	¼	2	Opt	.....
Nelson & LeMoon F5	4	¼	1½	⅛	18	4	¼	2	18	4	¼	2	Opt	.....
Netco D	3	⅛	1½	...	13	3½	¼	2	13	3½	¼	4	116	34
Netco H	3	⅛	1½	...	13	3½	¼	2	13	3½	¼	4	144	34
Niles E	...	...	1¾	1¾	12	3¾	¼	2	12	3¼	¼	2	114	.....
Noble A20	...	...	1	...	...	...	...	...	...	...	...	...	124	34
Noble B30	...	...	1	...	...	...	...	...	...	...	...	...	136	34
Noble C40	...	...	1¼	...	...	...	...	...	...	...	...	...	148	34
Noble D50	...	...	1¼	...	...	...	...	...	...	...	...	...	172	34
Noble E70	...	...	1¼	...	...	...	...	...	...	...	...	...	172	36
Northway B2	...	...	1 ⅛	1¾	50½	2¼	¼	2	50½	2¼	¼	2	118	33
Northway B3	...	...	1 ⅛	1¾	54	2½	¼	2	54	2½	¼	2	148	34⅝
O. K	3	⅛	1¼	...	43	2½	⅛	1	58	2½	⅛	1	125	35
O. K	3	⅛	1¼	...	43	2½	⅛	1	58	2½	⅛	1	125	35
Old Hickory W	3	⅛	1⅜	1	24	2¼	¼	2	24	2¼	¼	2	120	36
Old Reliable A	3	¼	1	1	48	2	¼	1	48	2	¼	1	105	32
Old Reliable B	3	¼	1¼	1¼	54	2	¼	1	54	2	¼	1	144 5/6	32
Old Reliable C	3	¼	1½	1½	60	2½	¼	1	60	2½	¼	1	150 5/6	32
Old Reliable D	3	¼	1½	1½	72	2½	¼	1	72	2½	¼	1	156 5/6	34
Old Reliable K, L, M	3	¼	1½	1½	54	3½	¼	1	60	4	¼	1	107	36
Oldsmobile T	3	3 ⅛	1	⅛	42¼	2	⅛	1	41 ⅛	2	⅛	1	92 5/6	34
Oneida A	3	⅛	.....	.....	12	3¼	¼	4	.....	.....	.....	.....	130	32
Oneida B	3	¼	.....	.....	12½	3½	¼	4	.....	.....	.....	.....	130	32
Oneida C	3	⅛	.....	.....	12½	3½	¼	4	.....	.....	.....	.....	146	32
Oneida D	3	⅛	.....	.....	15 5/8	3¾	¼	4	.....	.....	.....	.....	162	36
Oneida E	3	⅛	.....	.....	18	4	¼	4	.....	.....	.....	.....	204	38
Oshkosh A	3	⅛	1¼	2	23 5/8	3	¼	1	43 ⅛	2½	⅛	2	108 5/8	34
Oshkosh AA	3	⅛	1¼	2	23 5/8	3	¼	1	43 ⅛	2½	⅛	2	143 5/8	34
Packard 1½E	3	¼	1⅝	1¾	7 ⅛	4¾	¼	2	14	2	⅛	2	126	31¾
Packard 2E	3	¼	1⅝	1¾	7 ⅛	4¾	¼	2	14	2	⅛	2	132	31¾
Packard 3E	3	¼	1⅝	1¾	9 ⅛	4¾	¼	2	17	3	⅛	2	144	39
Packard 4E	3	¼	1⅝	1¾	9 ⅛	4¾	¼	2	18¾	3	⅛	2	144	39
Packard 5E	3	¼	1⅝	1¾	9 ⅛	6½	¼	2	18¾	3½	⅛	2	144	39
Packard 6E	3	¼	1⅝	1¾	9 ⅛	6½	¼	2	18¾	3½	⅛	2	144	39
Paige 50-18	3	⅛	.....	.....	13¼	3½	¼	4	13¼	3½	¼	4	126	33
Paige 51-18	3	⅛	.....	.....	13¼	3¾	¼	4	13¼	3¾	¼	4	144	35
Parker F9	3	¼	1¼	.....	10¾	5	¼	2	17	2½	¼	4	127	33
Parker J9	3	...	1¼	.....	10¾	5	¼	2	17½	3½	¼	4	139½	33
Parker M9	3	¼	1½	.....	10¾	5	¼	2	18	4	¼	8	145	37
Patriot Lincoln	3	⅛	1 ⅛	1 ⅛	41	1¾	¼	2	41	1¾	¼	2	109	34
Patriot Revere	3	...	1 ⅛	1 ⅛	41	1¾	¼	2	41	1¾	¼	2	92½	33¼
Patriot Washington	3	⅛	1 ⅛	1 ⅛	55	2¼	¼	2	55	2¼	¼	2	113¾	34
Piedmont 4-30	...	...	1	⅛	20	2½	⅛	2	16	2¼	⅛	2	100	36
Pierce-Arrow 5	3	⅛	1½	1¾	7¼	3½	⅛	2	18	4	⅛	4	144 ⅛	38⅛
Pierce-Arrow 2	4	¼	1⅜	1¾	8 ⅛	5	⅛	2	18 ⅛	3	⅛	4	126 ⅛	34⅛
Pittsburgher 2½	3	¼	1¼	1¼	44	2¼	¼	2	44	2¼	¼	2	136	33
Pony ¼	3	⅛	⅞	⅞	...	...	...	...	10	1½	⅛	2	40	24
Rainier R6	3	⅛	1 ⅛	⅛	19	2	⅛	2	19	2	⅛	2	96½	34
Rainier R9	3	⅛	1 ⅛	⅛	44½	2	¼	1	44½	2	¼	1	124	34
Rainier R11	3	⅛	1 ⅛	⅛	11¼	3	⅛	2	11¼	3	⅛	2	87¾	34
Reliance A10	3	¼	1¼	⅛	15	2	⅛	4	15	2	⅛	4	122	32
Reliance B20	3	¼	1¼	⅛	15	2	⅛	4	15	2	⅛	4	127	32
Reo F	3	⅛	1	1	43	2¼	⅛	2	38 ⅛	2	⅛	1	84	30
Republic 10	3	⅛	1	....	45	2½	⅛	2	43	2¼	⅛	2	98½	34
Republic 11X	3	⅛	1	....	54¾	2¼	⅛	2	52½	2¼	⅛	2	118½	34
Republic 19	3	⅛	1¼	....	54¾	2¼	⅛	2	52½	2¼	⅛	2	120¾	34
Republic 20	3	¼	1¼	....	56½	3½	⅛	2	31	4½	⅛	1	146	37
Reynolds 3A	...	...	1¼	....	46	2	¼	2	46	2	¼	2	.....	33
Reynolds 5A	...	...	1¼	....	52½	2¼	¼	2	52½	2¼	¼	2	.....	33
Reynolds 7A	...	...	1¼	....	57	2½	¼	2	57	2½	¼	2	.....	38
Reynolds 10A	...	...	1¼	....	70	3	¼	2	70	3	¼	2	.....	38
Riker B, BB	5	¼	...	....	7¼	4½	⅛	2	20	4	⅛	4	150	38
Rock Falls 1919	3	⅛	1½	....	43	2	⅛	2	40½	2	⅛	2	87	33
Rock Falls 1920	...	...	...	...	...	...	...	...	...	...	...	...	87	33
Rowe CW	...	...	1	⅛	19	2	⅛	8	19	2	⅛	8	121½	33
Rowe CDW2	4	¼	1¼	⅛	45	2	⅛	4	45	2	⅛	4	123	33
Rowe CDW2½	4	¼	1¼	⅛	51½	2½	⅛	4	51½	2½	⅛	4	147	33
Rowe DEW3½	4	¼	1¼	⅛	56½	2½	⅛	4	56½	2½	⅛	4	150	36
Rowe FW5	4	¼	1½	⅛	68	3	⅛	4	68	3	⅛	4	156	38½
Rowe GW3	3	⅛	1¼	⅛	...	...	...	...	...	...	...	...	144	33
Sandow G	3	⅛	1	⅛	20	2	⅛	2	20	2	⅛	2	96	34

Replacement Table—Continued

Name, Mode and Tonnage	ENGINE				BRAKE LINING								FRAME	
	Piston Rings		Carburetor		Service				Emergency				Length	Width
	No. per Cyl.	Diameter	Outlet Diameter	Inlet Diameter	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Sandow CG	3	1/8	1	1/8	20	2	1/8	2	20	2	1/8	2	120	34
Sandow I	3	1/8	1	1/8	60	3	1/8	1	60	3	1/8	1	132	32
Sandow J	3	1/8	1 1/4	1/8	13 1/2	3 1/2	1/4	2	16	3 1/2	1/4	2	144	37
Sandow L	3	1/8	1 1/4	1/8	18 1/2	4	1/4	2	18 1/2	4	1/4	2	144	37
Sanford 25	3	1/4	1 1/4	1 1/4	51 1/2	2 1/4	1/8	1	51 1/2	2 1/2	1/8	1	144	35
Sanford W35	3	1/8	1 1/4	1 1/4	56	2 1/2	1/8	1	56	2 1/2	1/8	1	145	35
Sanford W50	3	1/8	1 1/4	1 1/4	69	3	1/8	1	69	3	1/8	1	145	35
Schacht 2	3	1/4	1 1/4	.....	8	3	1/4	2	13 1/2	3	1/4	4	116	35 1/4
Schacht 2½	3	1/4	1 1/4	.....	8	3	1/4	2	13 1/2	3	1/4	4	140	35 1/4
Schacht 3½	3	1/4	1 1/4	.....	8	3	1/4	4	13 1/2	3	1/4	4	152	35 1/4
Schacht 5	3	1/4	1 1/4	.....	8	3	1/4	4	15	4	7/8	4	152	35 1/4
Selden 1½A	3	1/8	1	1 1/8	11 11/16	3 1/4	1/8	2	11 11/16	3 1/4	...	2	114	34
Selden 2½A	3	1/8	1	1 1/8	13 3/8	3 1/2	1/8	2	13 3/8	3 1/2	...	2	144	34
Selden 3½A	3	1/8	1 1/4	1 1/8	15 3/4	3 3/4	1/8	2	15 3/4	3 3/4	1/8	2	195	37 1/2
Selden 5A	3	1/8	1 1/4	1 1/8	18	4	1/8	2	....	4	1/8	2	168	.....
Service 220	3	1/8	1 1/4	1/8	12	3 1/4	1/4	2	12	3 1/4	1/4	2	109 1/2	34
Service 31	3	1/4	1 1/8	1 1/8	13 1/2	3 1/2	1/4	2	13 1/2	3 1/2	1/4	2	121 1/8	34
Service 36	3	1/4	1 1/8	1 1/8	13 1/2	3 1/2	1/4	2	13 1/2	3 1/2	1/4	2	121 1/8	34
Service 51	3	1/4	1 1/8	1 1/8	13 1/2	3 1/2	1/4	2	13 1/2	3 1/2	1/4	2	131 7/8	34
Service 71	3	1/4	1 1/8	1 1/8	16	3 3/4	1/4	2	16	3 3/4	1/4	2	150 1/4	38
Service 76	3	1/4	1 1/8	1 1/8	16	3 3/4	1/4	2	16	3 3/4	1/4	2	145 3/4	38
Service 101	3	1/4	1 1/8	1 1/8	18 1/2	4	1/4	2	18 1/2	4	1/4	2	145 3/4	38
Signal F	3	1/8	1 1/8	1 1/8	12	3 1/4	1/4	2	12	3 1/4	1/4	2	211	34
Signal H	3	1/8	1 1/8	1 1/8	12	3 1/4	1/4	2	12	3 1/4	1/4	2	211	34
Signal J	3	1/8	1 1/8	1 1/8	13 1/2	3 1/2	1/4	2	13 1/2	3 1/2	1/4	2	220	34
Signal M	3	1/8	1 1/8	1 1/8	16	3 1/2	1/4	2	16	3 1/2	1/4	2	268	38
Signal R	3	1/4	1 5/8	1 7/8	18	4	1/4	2	18	4	1/4	2	280	38
Stoughton B	...	...	...	...	...	...	...	...	...	...	...	...	124	.....
Stoughton D	...	...	...	...	...	...	...	...	...	...	...	...	124	.....
Stoughton E	...	...	...	...	...	...	...	...	...	...	...	...	136	.....
Standard 56	3	1/8	1	1 1/8	10 11/16	3	1/4	4	10 11/16	3	1/4	4	120	32
Standard 76	3	1/8	1 1/4	1 1/8	13 1/16	3 1/2	1/4	4	13 1/16	3 1/2	1/4	4	122	32
Standard 66S	3	1/8	1 1/4	1 1/8	15 5/16	3 3/4	1/4	4	15 5/16	3 3/4	1/4	4	144	38
Standard 86	3	1/8	1 1/4	1 1/8	17 11/16	4	1/4	4	17 11/16	4	1/4	4	144	38
Sterling 1½	3	1/4	1 1/4	1/4	11 5/8	3 1/4	1/4	8	11 5/8	3 1/4	1/4	8	120	33 1/2
Sterling 2½	3	1/4	1 1/4	1/4	13 1/8	3 1/2	1/4	8	13 3/8	3 1/2	1/4	8	138	34
Sterling 3½	3	1/4	1 1/4	1/4	15 1/2	3 3/4	1/4	8	15 1/2	3 3/4	1/4	8	144	38
Sterling 5-Worm	3	1/4	1 1/4	1/4	18	4	1/4	8	18	4	1/4	8	158	38
Sterling 5-Chain	3	1/4	1 1/4	1/4	56 1/2	3 1/2	1/4	2	28 3/4	4	1/4	1	158	38
Sterling 7½	3	1/4	1 1/4	1/4	56 1/2	3 1/2	1/4	2	28 3/4	4	1/4	1	158	38
Stewart M7	3	1/8	.....	1 1/8	50 5/8	2	1/8	2	8	5	1/8	2	150 1/2	32
Stewart M8	3	1/8	.....	1	41 3/8	2	1/8	2	22 3/4	2	1/8	1	99 1/2	32
Stewart M9	3	1/8	.....	1	48 1/2	2	1/8	2	8	5	1/8	2	119	32
Stewart M10	3	1/8	.....	1 3/8	60	3	1/8	2	8	5	1/8	2	163 3/4	32
Stewart M11	3	1/8	.....	7/8	41 3/8	2	1/8	2	22 3/4	2	1/8	1	95	32
Sullivan E	3	1/4	1 1/8	1 1/8	13	3 1/2	1/4	8	13	3 1/2	1/4	8	106	33 1/2
Sullivan F	3	1/8	1 1/8	1 1/8	13	3 1/2	1/4	8	13	3 1/2	1/4	8	146	34
Superior D	3	3 1/4	1 1/8	1 1/8	45	2 1/2	1/8	2	44	2 1/4	1/8	2	97 3/4	.....
Superior E	3	4 1/8	1 1/8	1 1/8	54	2 1/2	1/8	2	53 1/2	2 1/2	1/8	2	114	.....
Texan TK39	3	1/8	1	1 1/4	17 1/2	2 1/4	1/4	4	17 1/2	1 1/2	1/4	4	100	36
Tiffin GW	3	1/8	1 1/4	1 1/4	46	2	1/4	1	46	2	1/4	1	117	35
Tiffin MW	3	1/8	1 1/4	1 1/4	52	2 1/4	1/4	1	52	2 1/4	1/4	1	138	32 3/4
Tiffin PW	3	1/8	1 1/4	1 1/4	58	2 1/2	1/4	1	58	2 1/2	1/4	1	151	35 1/2
Tiffin TW	3	1/8	1 1/4	1 1/4	58	3	1/4	1	58	2 1/2	1/4	1	156	38 1/2
Tiffin UW	3	1/8	1 1/4	1 1/4	58	3	1/4	1	58	2 1/2	1/4	1	156	38 1/2
Titan 3½	3	1/4	1 1/2	1 3/4	60	2 1/4	1/8	2	14	4 1/2	1/8	2	144	34
Titan 5-6	3	1/4	1 1/2	1 3/4	90	2 1/4	1/8	2	14	4 1/2	1/8	2	144	34
Titan 2½	3	1/4	1 1/4	1 1/4	54	2 1/4	1/8	2	26	4	1/8	1	144	32
Tower J	3	1/8	1 1/4	1 1/4	....	....	....	....	....	....	....	....	138	32 1/2
Tower H	...	...	1 1/4	1 1/4	....	....	....	....	....	....	....	....	150	32 1/2
Tower G	3	1/4	1 1/2	1 1/2	....	....	....	....	....	....	....	....	156	37
Traffic C	3	1/8	1	1/8	42 1/2	2 1/2	1/8	2	39 1/2	1 3/4	1/8	2	120 3/4	42
Transport 20	3	1/8	.....	.....	46 1/2	2 1/2	1/8	2	47	2 1/2	1/8	2	101	34
Transport 30	3	1/8	.....	.....	46 1/2	2 1/2	1/8	2	47	2 1/2	1/8	2	116 5/8	34
Transport 50	3	1/8	.....	.....	50	3	1/8	2	48 1/2	2 1/2	1/8	2	123	34
Triangle AA	3	....	1	1	23 1/8	2 1/2	1/8	1	41	2	1/8	1	94	35
Triangle A	3	....	1	1	10	4	1/8	2	49	2	1/8	1	126	34

Name, Model and Tonnage	ENGINE				BRAKE LINING								FRAME	
	Piston Rings		Carburetor		Service				Emergency				Length	Width
	No. per cyl.	Diameter	Outlet Diameter	Inlet Diameter	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Triangle B	3	....	1 1/4	1 1/4	10	4	1/8	2	52	2	1/8	1	132	34
Triangle C	3	....	1	1	10	4	1/8	2	52	2	1/8	1	128 3/8	34
Triumph 1½	...	...	...	...	...	...	...	...	...	...	...	...	120	.....
Twin City A & B	3	....	2	2	16	3 1/2	1/4	2	48	3 1/2	1/4	2	138	46
Union F	3	1/4	1 1/4	1	55	3	1/8	1	50	2	1/8	1	144	32
Union H	3	1/4	1 1/4	1	19	3 1/2	1/8	2	10	4	1/8	1	168	34
U.S.N	3	1/8	1	1/8	50 1/2	2	1/8	2	46 1/2	1 1/2	1/8	2	120	34
U.S.H	4	1/8	1 1/4	1/4	46	2 1/4	1/4	2	46	2 1/4	1/4	2	132	36
U.S.J	3	1/8	1 1/2	1/4	50	2 1/2	1/4	2	50	2 1/2	1/4	2	156	39
U.S.K	...	1/4	1 1/2	1/4	62	3	1/4	2	62	3	1/4	2	168	39
Velie 46	3	1/8	1	1/8	54 1/16	2 1/2	1/8	2	52 1/8	2 1/4	1/8	2	120	31
Velie 26B	3	1/8	1 1/4	1/8	15 5/8	3 3/4	1/8	4	15 5/8	3 3/4	1/8	4	154 1/2	37
Vim 27	3	1/8	7/8	....	14 1/2	1 1/2	1/8	4	14 1/2	1 1/2	1/8	4	64	30
Vim 28	3	1/8	7/8	....	14 1/2	1 1/2	1/8	4	14 1/2	1 1/2	1/8	4	83 1/2	30
Vim 25	4	1/8	1	....	19	2	1/8	4	19	2	1/8	4	92	32
Vim 22	4	1/8	1	....	44 1/2	2	1/4	2	44 1/2	2	1/4	2	121 1/4	34
Vim 23	5	1/8	1 1/4	....	51 1/2	2 1/4	1/4	2	51 1/2	2 1/4	1/4	2	159 1/2	34
Walker M½	...	...	...	...	43	2 1/4	1/8	2	18	1 3/4	1/8	4	87	32
Walker K1	...	...	...	...	46	2 1/2	1/8	2	18	2	1/8	4	96	32
Walker L2	...	...	...	...	53 1/2	2 1/2	1/8	2	22 1/2	2	1/8	4	120	35
Walker P3½	...	...	...	...	53 1/2	3	1/8	2	22 1/2	2 1/2	1/8	4	140	35
Walker N5	...	...	...	...	53 1/2	3	3/8	2	22 1/2	2 1/2	1/8	4	162	35
Walter S	3	1/4	1 3/4	....	15	5	1/4	4	57	2 1/2	1/4	2	150	36
Walter T	...	...	1 1/2	....	14	4	1/4	4	50	2 1/2	1/4	2	144	33
Ward LaFrance 2B–2½	3	1/8	.....	1 1/4	13 1/16	3 1/2	1/4	4	13 1/16	3 1/2	1/4	4	125	33
Ward LaFrance 4A–3½	3	1/8	.....	1 1/2	15 5/8	3 3/4	1/4	4	15 5/8	3 3/4	1/4	4	170	37
Ward LaFrance 5A–5	3	.....	.....	.....	17 11/16	4	1/4	4	17 11/16	4	1/4	4	170	37
Ward WS	...	...	...	...	29	1 1/2	1/8	2	15 3/4	1 1/2	1/8	1	72	37 1/2
Ward WA	...	...	...	...	16	1 3/4	1/8	8	16	1 3/4	1/8	8	95	33 1/8
Ward WB	...	...	...	...	20	2	1/8	8	20	2	1/8	8	120	33 3/4
Ward WD	...	...	...	...	48 7/8	2 1/4	1/4	4	48 7/8	2 1/4	1/4	4	144	33 7/8
Ward WF	...	...	...	...	56 7/8	2 1/2	1/4	4	56 7/8	2 1/2	1/4	4	168	34 5/8
Ward WH	...	...	...	...	68 3/4	3	1/4	4	68 3/4	3	1/4	4	192	37
Ware 3½ & 1½	...	.....	2 1/2	1 1/2	....	3	1/4	...	42	3	1/4	...	120	36
White 15	3	....	1 1/4	....	...	...	...	...	...	...	...	...	76 1/2	34
White 20	3	....	1 1/4	....	...	...	...	...	...	...	...	...	107 1/2	34
White 40	...	...	1 1/4	....	...	...	...	...	...	...	...	...	157	42
White 45	...	...	1 1/2	....	...	...	...	...	...	...	...	...	157	42
White Hickory H	3	1/8	1 1/4	1 1/2	13 1/2	3 1/2	1/4	4	13 1/2	3 1/2	1/4	4	116 1/4	32
Wichita L	3	1/8	1	1 3/8	19	2	1/8	2	19	2	1/8	2	126 1/2	30
Wichita M	3	1/4	1	1 3/8	45	2	1/4	2	45	2	1/4	2	126 1/2	30
Wichita RX	3	....	1 1/4	1 3/4	51	2 1/4	1/4	2	51	2 1/4	1/4	2	126 1/2	30
Wichita O	4	1/4	1 1/4	1 3/4	56	2 1/2	1/4	2	56	2 1/2	1/4	2	152 1/2	36
Wichita S	4	1/4	1 1/2	2	60	3	1/4	2	60	3	1/4	2	163 1/2	36
Wilcox A	3	1/4	.....	.....	24 1/2	2 1/2	1/8	4	16	2 1/2	1/8	4	96	34
Wilcox B	3	1/4	.....	.....	24 1/2	2 1/2	1/8	4	16	2 1/2	1/8	4	132	33
Wilcox C	...	...	.....	.....	27 1/2	2 1/2	1/8	4	20	2 1/2	1/8	4	141	33
Wilcox D	...	...	.....	.....	56 1/2	2 1/2	1/4	2	56 1/2	2 1/2	1/4	2	153	33
Wilcox W	3	1/4	.....	.....	68 1/2	3	1/4	2	68 1/2	3	1/4	2	153	38
Wilson 1½	3	1/8	.....	1	39 1/2	1 3/4	1/8	4	39 1/2	1 3/4	1/8	2	120	33
Wilson 2½	3	1/8	.....	1 1/4	13 1/4	3 1/2	1/8	4	13 1/4	3 1/2	1/8	4	126	33
Wilson 3½	3	1/8	.....	1 1/2	16	3 3/4	1/8	4	16	3 3/4	1/8	4	147	38
Wilson 5	3	1/8	.....	1 1/2	18	4	1/8	4	18	4	1/8	4	147	38 1/4
Winther 39	3	1/4	1 1/4	.....	50	2 1/4	1/4	2	22 1/2	2 1/4	1/4	1	120	30
Winther 430	3	1/4	1 1/4	.....	50	2 1/4	1/4	2	22 1/2	2 1/4	1/4	1	120	30
Winther 49	3	1/4	1 1/4	.....	52	3	1/4	2	50	2 1/4	1/4	2	144	33
Winther 459	3	1/4	1 1/4	.....	52	3	1/4	2	22 1/2	2 1/4	1/4	1	144	30
Winther 70	3	1/4	1 1/4	.....	62	3	1/4	2	60	2 1/2	1/4	2	156	33
Winther 479	3	1/4	1 1/4	.....	62	3	1/4	2	60	2 1/2	1/4	2	156	33
Winther 979	3	1/4	1 1/4	.....	52	3	1/4	2	50	2 1/4	1/4	2	168	33
Winther 89	3	1/4	1 1/4	.....	93	2 1/4	1/4	2	93	2 1/4	1/4	2	156	33
Winther 109	3	1/4	1 1/2	.....	93	2 1/4	1/4	2	93	2 1/4	1/4	2	156	33
Winther 129	3	1/4	1 1/2	.....	93	2 1/4	1/4	2	93	2 1/4	1/4	2	156	33
Winther 149	3	1/4	1 1/2	.....	93	2 1/4	1/4	2	93	2 1/4	1/4	2	156	33
Witt Will N	3	1/8	1 1/4	1 1/4	46	3 1/4	1/4	4	46	3 1/4	1/4	4	102	32
Witt Will P	3	1/8	1 1/4	1 1/4	48	3 1/2	1/4	4	48	3 1/2	1/4	4	122	32
Wolverine C	...	....	1	1	41 1/2	2 1/2	1/8	2	41 1/2	1 3/4	1/8	2	120	34 1/2

Operating and Maintaining a Fleet of Trucks in the Wholesale Hardware Business

By K. HERRICK

PROBABLY no corporation operating in Philadelphia takes better care of its motor trucks, or maintains a better appearing fleet than the Simmons Hardware Co., of "Keen Kutter" fame, a wholesale concern whose parent company is located in St. Louis, having branches in New York, Toledo, Minneapolis, Sioux City, Wichita and Memphis.

The fleet of the Philadelphia company consists of thirteen vehicles, including a Ford runabout converted into a service car for emergencies, eight 2-ton and one 5-ton Pierce-Arrow; one 5-ton and one 2-ton Packard and a Dodge delivery car.

Painted a "midnight blue" and bearing on a panel near the front of each side the well-known "Keen Kutter" design in red, white and gold, the units of the fleet, with their high-stake, rack bodies make a decidedly pleasing impression.

The trucks were purchased in September, 1918, displacing teams and have given satisfaction. While it is a rare team, in any line of business, that is not occasionally sick, or has to take considerable time out to be shod, or for other reasons, the trucks have not lost two days for repairs since their installation.

Estimate Fourteen Miles Per Day

A rough estimate of the mileage, per year, of the Pierce-Arrows, is 5000 mi., and of the Packards, 4000. Fourteen miles per day, per truck is a fair average for the busiest periods, with six loads a day for each unit. Most of the operation of the fleet is within a radius of two sq. mi.

Collectively, 107 gal. of gasoline are used by the trucks on an average per month, which average is taken at the end of each month. In the same period, 12 pt. of oil are used for lubricating, and 5 lb., or one pail, of grease.

The garage, which is devoted exclusively to the company's trucks, is located about two miles from the plant.

The trucks assemble early enough in the morning to be able to leave the platforms in the rear of the store, fully laden, by eight o'clock. Each driver previously has received his routing from the dispatcher's office in the store. The routing is made out at night, so no working hours will be lost in this respect in the morning. With this arrangement the driver has no excuse for being late in getting under way.

One 2-ton Pierce-Arrow delivers a load to the Philadelphia & Reading Railway freight terminal at Broad & Callowhill Sts., and then proceeds to the terminal at Front & Noble Sts. Another like unit covers a route with stops at Broad & Washington and Broad & Callowhill terminals. The 5-ton Packard travels to the Dock St. wharf to pick up loads, as well to deliver. The 2-ton Packard is utilized for city deliveries, making two outbound trips, the second one at 2.30 P. M., and returns with a load. In fact, routing is so done that, whenever possible, the trucks on the inbound trips will bring loads. The 2-ton Packard sometimes travels fifty-five miles a day, incurred by suburb deliveries.

DRIVER'S DAILY RECORD CARD

Truck No..... Date.....

Gallons Gasoline_____

Pints Motor Oil_____

Pints Gear Oil_____

Miles Run_____

Tonnage Carried Out_____

" " In_____

Number of Stops_____

Tire Replacement_____

Net Running Time_____

Remarks_____

_____

_____

_____

Driver's Signature

Twelve of These Cards, One for Each Driver, Are Kept in the Garage Wall Cabinet and Changed Daily

A 2-ton truck is used for deliveries to various outlying points in the city, while another covers the central and southern portions of the city on its morning run and, in the afternoon covers the central district again, picking up "specials."

The Dodge commercial car is used almost exclusively for small pickups. It is known as the "buy-out" car, because of its employment on "outside" purchases in small quantities. It serves as an accommodation truck, picking up extras, when other cars are filled, to complete a consignment to or from a freight terminal or wharf. It also enables the company to accommodate its customers on special deliveries.

Eighteen drivers and two helpers are employed—the helpers assisting exclusively on the 5-ton trucks, except in cases of emergency.

The Ford service car is always prepared for emergencies. The outfit includes several jacks; wrenches of various kinds; small tools; extra parts and a 100-ft. towing chain.

Careful Maintenance

In addition to inspection and repairs rendered by the service departments of the concerns from which the trucks were purchased—blank forms being supplied by these companies for recording thereon what is needed and what is done on each truck—the hardware company's transportation department has its own system of inspection. Each car, upon attaining the 1500 mi. mark, is completely overhauled, including painstaking examination and adjustment of anything that may need it, as regards the engine, transmission, rear, valves, brakes, cabs, bodies and the like.

Oil is changed without fail every 250 mi. In addition, the engine is cleaned every week and all grease cups are filled and turned down thoroughly twice a week. In changing oil every crankcase is carefully drained and then scrupulously cleaned. The trucks are given a general inspection every night, to see that each unit is in proper condition, including the tightening of all nuts and bolts. Every truck is washed at least once a week, and oftener, if necessary.

Type of Truck Used by the Simmons Hardware Company

Small tool kits carried on the trucks are padlocked and only the drivers have the keys thereto.

A Splendidly Equipped Garage

To the right of the garage door, as one enters, is a pit containing 250 gal. of gasoline and to the left another pit, holding 550 gal. The fuel is pumped from the outside. The lubricating oil, purchased in quantity, is kept in large portable cans.

The garage measures 125 x 50 ft., the center of which is clear of posts. The building is steam-heated, the system including one set of coils located immediately behind the work bench to provide greater comfort for the mechanics. Six skylights and two windows in the front provide excellent light during the day and a complete electrical system furnishes illumination at night.

The garage office is at the right front section of the building and beside the office door, on the partition wall, there is a cabinet containing twelve compartments, one for each driver.

These cards, each 6 x 3½ in., have spaces for the following entries:

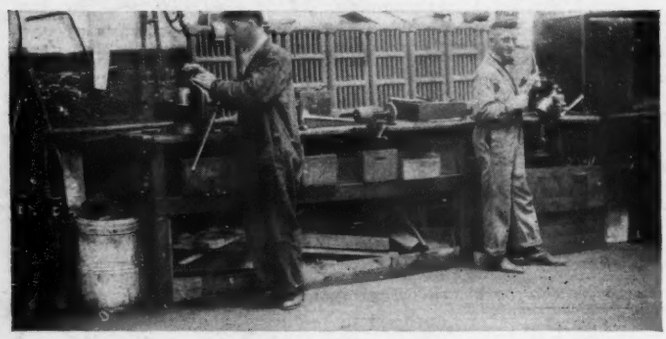
Truck Number, Date, Gallons of Gasoline, Pints of Motor Oil, Pints of Gear Oil, Number of Miles Run, Tonnage Carried on Trip Out, Tonnage Carried on Trip In, Number of Stops Made, Tire Replacement, Net Running Time, Remarks and the driver's signature at the bottom of the form.

The data from these slips are transferred nightly to a single record book kept in the garage office. The usual bill of lading and delivery slip containing spaces for the entries of "C. O. D.'s" and "Charges," are supplied by the dispatcher.

In This Wall Cabinet Beside the Garage Office Door Are Kept the Daily Record Cards of the Twelve Drivers

While the service stations of the Pierce-Arrow and the Packard companies are relied upon for possible repairs of a special nature, a good deal of the repair work is done by the mechanical force in the garage repair ship.

In the garage shop section, engines are torn down and rebuilt, bearings taken up and adjusted, valves ground, etc. The garage equipment includes a chain hoist for lifting frames and the heavier parts, emery wheel sets for grinding, and a 12-in. drill press.



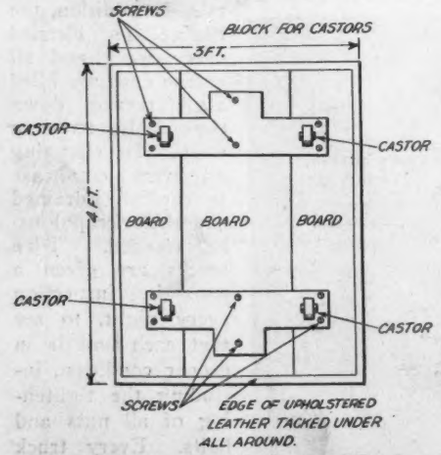
Workshop Section of the Simmons Hardware Company Garage.

Minor repairs are made here on the fleet of thirteen trucks and the fifteen foot bench has complete equipment for this purpose.

The 15-ft. work bench is completely equipped with vises, wrenches, pliers, pullers and the usual small tools, while at one end of the bench is a convenient tool chest, or cabinet, provided with a lock. Here are kept the tools more generally in use, to be handy to the bench.

There are sixteen special parts lockers on the outside partition wall of the office, with a special stock compartment on a gallery about 15 ft. above the floor. Arranged along the wall at the rear of the building is a row of lockers for the clothing of the drivers, helpers and members of the mechanical force. Stock may be obtained only through requisition from the office and all tools taken from the tool bins and compartments must be replaced immediately after using. This system avoids any confusion or mislaying of implements and parts.

The mechanics have invented their own "creeper" for lying on while working under a car. It consists of a wooden "raft" 3 ft. wide, 4 ft. long and raised from the floor by small casters, screwed to cross-pieces which help to keep the "raft" together. These cross-pieces are block-like and the casters at each end do the "creeping" as the "raft" is shoved along underneath the car by the body of the worker lying upon it. The surface of the "raft" is upholstered in leather with excelsior stuffing and equipped at the "head-end" with a small raised bolster, or pillow, likewise upholstered, for resting the mechanic's head as he works.



General Construction of "Creeper" Designed by Mechanics of the Simmons Hardware Company, for Lying on While Working Beneath Motor Trucks.

England in Need of Light-Weight Trucks

Demand for light trucks of one-ton and one-and-one-half-ton capacity is very pronounced in England, according to H. Herbert P. Seabrook, of Seabrook Bros., London, representatives of the Napoleon Motors Co. Mr. Seabrook visited the Napoleon factory at Traverse City in December. He states England was overstocked on heavier trucks, due to the recent war, when a large stock was left on their hands. The remarkable roads in England allow of high speed, and this is advantageous with the lighter truck. Mr. Seabrook said the British industries were getting on their feet very fast and that business generally was looking forward to a large volume and preparing to go after the world's trade. The people of his country, he said, paid little attention to the appearance of the truck in respect to paint and decoration. They do, however, place great stress upon the attention paid to oiling and greasing the vehicle, and are very particular to spend at least one hour per day on each vehicle to see that it is properly lubricated. He said that trucks for foreign shipment were entirely satisfactory if in the priming coat. It is the opinion of C. D. Peet, sales manager of the Napoleon company, that England would have a better impression of the truck finished in a superior manner and that there would be better advertising for American trucks were they to be shipped to foreign countries finished in a high-class manner. This company is doing a healthy export business in England and in other European countries.